Building PCB Decontamination Work Plan

Indianapolis Return Center
3333 N. Franklin Road
Indianapolis, Indiana

DLA Piper, LLP

GHD | 6520 Corporate Drive Indianapolis Indiana 46278
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1. Introduction

1.1 Background

At the request of DLA Piper, LLP, GHD Services Inc. (GHD) has prepared this Building PCB Decontamination Work Plan (Work Plan) for the mitigation of polychlorinated biphenyls (PCBs) at the former Walmart Indianapolis Return Center (IRC) building located at 3333 North Franklin Road in Indianapolis, Indiana (Site). The Site consists of one building on approximately 14.8 acres of land. The building is approximately 277,425 square feet (ft^2) in area and is comprised of warehouse space (approximately 246,875 ft^2) and ancillary office space (approximately 30,550 ft^2). The building was initially constructed sometime in the mid-1960s and has undergone at least one expansion. The structure is primarily block and corrugated sheet metal walls supported by a steel frame with metal roof and concrete floor slab. Currently, the building is vacant. Most recently, the building was used as a merchandise receiving/processing center for Walmart stores located throughout the Midwest[1]. The facility received and processed returned merchandise and either sent those goods back to the manufacturer, back to Walmart stores, or processed the goods for disposal or recycling. A Site Location map showing the location of the Site is provided in Figure 1. A Site Plan showing the location of the warehouse is provided in Figure 2.

1.2 Purpose

Several phases of investigation have been completed at the Site in 2014 and 2015 related to the discovery of polychlorinated biphenyl (PCB) contamination in waste sweepings generated from the cleaning of a battery recharge area within the facility in July 2014. The results of these previous investigations have shown that the PCB contamination is distributed in certain media throughout the building interior. The purpose of this Work Plan is to describe the Scope of Work (SOW) that will be conducted to obtain written concurrence from the U.S. Environmental Protection Agency (EPA) that the building is remediated. Generally, the scope of work includes select demolition of interior features that would be difficult to decontaminate (i.e., office area, certain fixtures, insulation, etc.), decontamination of the hard surfaces within the structure, and encapsulation of certain features from which PCB removal would be impractical.

2. Previous Investigations

2.1 Information Sources

Background information about the Site available to GHD consists of the following Phase I Environmental Site Assessments:

- Preliminary Environmental Site Assessment and Subsurface Investigation, 3333 North Franklin Road, Indianapolis, Indiana (American Environmental, December 2, 1991)
- Phase I Environmental Site Assessment, Wal-Mart Return Center, 3333 N. Franklin Road, Indianapolis, Marion County, Indiana (Terracon Consulting Engineers and Scientists, October 9, 2008)

[1] Terracon Consulting Engineers and Scientists. *Phase I Environmental Site Assessment, Wal-Mart Return Center, 3333 N. Franklin Road, Indianapolis, Marion County, Indiana*. October 9, 2008.

Reportedly, PCBs were detected at approximately 48.06 parts per million (ppm) in waste sweepings generated from the cleaning of a battery recharging area within the facility[2]. Analytical data in GHD's possession shows that PCBs were detected at concentrations ranging from 30 to 390 micrograms per kilogram (μg/kg) in six samples collected in the battery charging area by Waste Management, Inc. on July 24, 2014.

Subsequent to the discovery of PCBs in the battery charging area, separate investigations of the building and building contents were completed by APEX Companies, LLC. (APEX), ENVIRON International Corporation (ENVIRON), ARCADIS U.S., Inc. (Arcadis), the Indiana Department of Environmental Management (IDEM), and Conestoga-Rovers & Associates, Inc. (CRA). Note that CRA has since merged with and changed its name to GHD.

Building investigation reports relied upon by GHD to prepare this Work Plan included:

- Initial PCB Sampling, Indianapolis Return Center, APEX October 6, 2014
- EPA/IDEM Requested Polychlorinated Biphenyl (PCB) Sampling, Indianapolis Return Center, ENVIRON, September 26, 2014
- PCB Sampling Results, Arcadis November 3, 2014 (Partial copy -- no figures, tables, or appendices provided)
- Building Sampling Summary Report, CRA November 13, 2014
- Supplemental Sampling Report, GHD July 30, 2015

Walmart-owned equipment and merchandise also were sampled but these materials have since been removed from the building. Merchandise and equipment investigation documents made available to GHD included:

- Merchandise Packaging PCB Sampling, Indianapolis Return Center – 3333 North Franklin Road, APEX October 6, 2014
- IRC Merchandise Polychlorinated Biphenyl (PCB) Sampling Report, ENVIRON September 26, 2014
- Waste Handling Area Polychlorinated Biphenyl (PCB) Sampling Report, ENVIRON September 26, 2014
- IRC Equipment & TV Polychlorinated Biphenyl (PCB) Sampling Report, ENVIRON March 9, 2015
- IRC Wipe Sampling of Conveyor System and Storage Racks for Polychlorinated Biphenyls (PCBs), ENVIRON May 8, 2015
- IRC Wipe Sampling of Cleaned Conveyor System Motors for Polychlorinated Biphenyls (PCBs), ENVIRON June 5, 2015
- Office Memorandum (from Jasbir Lakhan to George Ritchotte), Analytical Results for Walmart Return Center, Indianapolis, Marion County, Indiana, IDEM May 12, 2015

[2] APEX Companies, LLC. *Initial PCB Assessment Sampling, Indianapolis Return Center, 3333 North Franklin Road, Indianapolis, Indiana*. October 6, 2014

2.2 Summary of Previous Findings

2.2.1 Merchandise Samples

ENVIRON, APEX, and IDEM collected wipe samples from the surfaces of merchandise and packaging and bulk samples of cardboard boxes, packaging and plastic wrap, and other materials. Based on GHD's September 15, 2015 inspection, Walmart-owned equipment and merchandise were removed from the building.

Merchandise Wipe Samples

PCBs were not detected in the large majority of the nearly 400 wipe samples from the surfaces of merchandise and packaging. In the handful of samples where PCBs were detected in merchandise wipe samples, the concentrations ranged from 0.15 to 0.58 micrograms per 100 square centimeters ($\mu g/100\ cm^2$).

Merchandise Bulk Samples:

APEX collected 148 bulk samples from merchandise cardboard boxes. PCBs were detected in 30 bulk samples of cardboard from the merchandise storage area at concentrations ranging from 0.47 to 8.6 milligrams per kilogram (mg/kg) as Aroclor 1260 in all but three of the samples. ENVIRON detected PCBs in 12 cardboard box samples at concentrations ranging from 0.14 to 1.9 mg/kg as Aroclor 1260.

APEX collected 21 samples of plastic wrap material from the merchandise area and PCBs were detected in all of these samples at concentrations ranging from 0.84 mg/kg to 8.6 mg/kg as Aroclor 1260. ENVIRON detected PCBs in 12 samples of plastic packaging materials at concentrations ranging from 1.1 to 27 mg/kg as Aroclor 1260.

It is also noted that APEX conducted wipe and bulk sampling of a file room located in the office in the southwestern portion of the building. PCBs were not detected in the 60 wipe samples collected from the file room, but one bulk sample of a cardboard box stored on top of a filing cabinet contained PCBs at a concentration of 1,000 mg/kg as Aroclor 1254 (see Appendix A of the APEX Merchandise Packaging PCB Sampling Report dated October 6, 2014).

2.2.2 Equipment Samples

ENVIRON collected wipe samples and bulk paint samples from the conveyor system and storage racks formerly present inside the building. PCBs were detected in three of four bulk paint samples at concentrations ranging from 0.95 to 6.6 mg/kg as Aroclor 1260. PCBs were detected in 11 wipe samples from the storage racks and conveyor at concentrations ranging from 0.32 to 12 $\mu g/100\ cm^2$ as Aroclor 1254 and Aroclor 1260. During March 2015, IDEM collected bulk samples of material that accumulated on a drop tray beneath a conveyor line and material accumulated on a conveyor line motor screen. PCBs as Aroclor 1260 were detected in these samples at concentrations of 31 and 34 mg/kg, respectively. These results suggest that the PCBs detected in these samples were related to the operation of the conveyor system.

DLA Piper LLC requested access to sample bulk dust and debris on, under, and around Walmart-owned equipment and inventory, but was refused such access on various occasions.

2.2.3 Building Materials

As part of the sampling activities performed in 2014 and 2015, GHD, ENVIRON, Arcadis, and IDEM collected bulk samples of concrete, paint (on wall, floor, and columns), dust and particulate matter, carpet, wallboard, floor expansion joint, caulk, insulation, siding, compressor oil, used oil, wood shavings, and general debris that were analyzed for PCBs. Additionally, wipe samples of various surfaces inside the structure also were analyzed for PCBs.

The materials and corresponding PCB concentrations are presented in the table below.

Table 1 PCB Bulk Materials Results Summary

Material	PCB Concentrations (mg/kg)
Paint	170 to 8,600
Fibrous floor expansion joint	11 to 2,700
Caulk	26
Wallboard	16 to 30
Carpet	17 to 29
Concrete floor	Non-detect to 20 (upper 0.5 inches only)
Dust and particulates	18 to 6,800
Insulation	Non-detect to 120
Tar Sample	220
Bulk foam insert	10

Additionally, the PCB concentrations observed in wipe samples from various surfaces within the building ranged from 1 to 1,710 μg/100 cm^2. The PCB detections in bulk and wipe samples of building materials were identified predominantly as Aroclor 1260. A small number of the samples were identified as Aroclor 1254 or as a mixture of Aroclors 1254 and 1260.

GHD collected bulk samples of exterior building roofing materials in February 2015. The roofing material was comprised of a top layer of solid rubber and an underlying layer of insulating fiberboard material. Beneath the fiberboard material was a tar-like substance that appears to be an adhesive material. GHD obtained two samples of the fiberboard insulating and adhesive materials at two locations on the roof. PCBs were not detected in the bulk samples of the roofing material (GHD, July 30, 2015).

2.2.4 Building Air Samples

Samples of indoor air were collected within the building on separate occasions by APEX, GHD, Arcadis, and ENVIRON and analyzed for PCBs. PCBs were not detected in any of the indoor air samples at concentrations above potentially applicable exposure criteria published by the EPA, the Occupational Health and Safety Administration (OSHA), and the national Institute for Occupational Safety and Health (NIOSH).

2.3 Source of PCB Impacts

2.3.1 Identification of the Release Source

During previous investigations, PCBs were detected in bulk construction materials (paint, caulk, wallboard, and floor joint material), and bulk dust samples collected throughout the interior of the structure. While the PCBs present in the bulk building construction materials (particularly, the floor paint) may account for some of the PCBs observed in the bulk dust samples throughout the interior of the structure, it is not likely that bulk building materials contributed significantly to the observed widespread distribution of PCBs in the dust samples throughout the structure's interior. Conversely, the PCB-containing dust accumulating on surfaces likely contributed to the presence of PCBs observed in some of the bulk building material samples such as carpeting, wallboard, and surfaces of concrete floors.

With isolated exceptions, PCB impacted materials and surfaces are not oily or greasy demonstrating that the primary PCB source was not oils, such as dielectric or hydraulic fluids. Rather, it is likely that use or operations, or some other event, by operators within the building introduced the PCB-containing dust into the building, which became widely distributed inside the building. The detections of PCBs, predominantly as Aroclor 1260, in packaging samples (cardboard and plastic) indicate that handling of these materials over the course of decades likely has contributed to the presence of PCBs in the dust and debris present throughout the interior of the structure. Due to the pervasiveness of dust within the building, GHD concludes that PCB-containing dust likely is the primary contributor of PCBs detected in wipe samples obtained from many of the building interior surfaces.

2.3.2 Estimated Date and Time of Release Occurrence

The date and time of the PCB releases within the building is unknown. Some of the PCBs were introduced during construction of the building in the 1960s or during subsequent additions as a component of the bulk construction materials (i.e., caulk, floor joint material, wallboard and paints). Other PCBs likely were introduced by operational-related modifications made to the building for a specific use such as warning and traffic line paint on the floors and support columns, although the specific timing of these modifications are not known. It is likely that use or operations, or some other event, by operators within the building caused the PCBs observed in the dust samples throughout the structure's interior but the mechanism and timing of the release(s) is not currently known.

2.3.3 Current Building Conditions

GHD completed an inspection of the interior of the building on September 15, 2015. Generally with the exception of a few miscellaneous items, GHD observed that all Walmart-owned equipment, merchandise, furniture, and supplies were removed from the structure and the warehouse was empty. A photograph log of the September 15, 2015 inspection is provided in Appendix A.

3. PCB Cleanup Approach

Generally, the approach to mitigation of the PCBs present inside the building includes the following tasks to be performed in the general order noted below:

1. Removal of the loose accumulations of dust and removal of floor paint

2. Select demolition/removal of interior features that would be impractical to decontaminate (i.e., wallboard, drop ceiling panels, floor tile, ducts and vents, plumbing fixtures, lighting fixtures, etc.)
3. Decontamination of building hard surfaces (such as walls, floors, ceilings) and certain equipment within the building to remove PCB-laden dust
4. Encapsulation of certain painted surfaces such as concrete block walls and columns where it would be impractical to remove the paint

PCB mitigation within the building will be performed in accordance with this Work Plan. Cleanup-related demolition debris and wastes will be characterized for disposal.

The following sections provide the reporting information stipulated for mitigation actions per 40 CFR 761.125(b)(3).

4. Demolition and Disposal

4.1 Pre-Demolition Activities

Before demolition commences, the loose accumulations of dust and particulate material will be removed. The intent of this effort is to minimize potential fugitive dust during subsequent demolition activities. Dust-laden drop ceiling panels in the office areas will be carefully removed and managed to minimize potential emission of dust. Remaining surfaces such as floors, carpets, etc. will be vacuumed with a HEPA vacuum, wetted and swept/scraped, or wiped down with damp cloths to capture loose dust and minimize potential fugitive dust during demolition.

Following initial dust removal activities, an asbestos-containing materials (ACM) survey will be conducted inside the structure by an Indiana licensed asbestos inspector. Friable ACM or ACM to be removed during demolition will be abated by an Indiana licensed asbestos abatement contractor with properly trained and certified asbestos workers using OSHA-compliant means and methods. ACM demolition debris will be segregated from the rest of the demolition debris and properly managed as described in Section 6.

Other pre-demolition activities to prepare office and plant floor areas will include removal of universal wastes such as battery devices, mercury-containing devices, and fluorescent and high-intensity discharge task lights. Light ballasts will be individually inspected, and if not specifically identified as non-PCB or PCB free, will be presumed to contain PCBs, drummed, and disposed as TSCA waste. Non-PCB ballasts will be segregated from PCB ballasts and appropriately disposed. Recoverable refrigerants will be evacuated from drinking fountains, freezers, refrigerators, air conditioners, and other such equipment by a licensed technician. Smoke detectors and miscellaneous cleaning products and materials will also be collected, properly packaged, and disposed or recycled.

Prior to the commencement of general demolition work, the building will be fully de-powered by a qualified electrical contractor. City water and natural gas will be shut off at the street and interior gas lines will be purged and capped at the point of building entry.

4.2 General Demolition Activities

Building decontamination work will be performed by a qualified contractor and workers with current 40-hour Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training consistent with 29 CFR 1910.120. The contractor will supply the necessary alternate power, lighting, water supply, facilities, and building ventilation to support work activities.

Demolition activities will be focused on non-structural and non-concrete bulk building materials (herein referred to as “soft structure” as described in bullet points below) within the exterior walls of the structure. To the extent practical, the front office/breakrooms and the shipping office will be demolished to the outside building walls, the concrete block walls between the office and warehouse, and the structural concrete floor supporting the mezzanine level above the front office and break rooms.

To reduce the amount of fugitive dust generated during the work, demolition will be performed by disassembly rather than tearing or knocking down structures. Materials will be wetted as necessary to immobilize dust. Excessively dusty materials such as insulation and drop ceiling tiles may be over packed in plastic bags or sheeting to prevent fugitive dust emissions during handling.

In the front office/breakroom and shipping office areas, including the upper mezzanine levels, examples of soft structure materials to be removed from the building include:

- Floor tiles
- Drop ceiling tiles
- Wallboard, paneling, wall studs, and insulation
- Built-in structures (e.g., shelves, storage cabinets, etc.)
- Carpeting
- Window treatments (e.g., blinds, draperies, etc.)
- Caulk around door and window frames

Building fixtures to be removed from the office areas include:

- Lighting fixtures
- Ductwork and grates
- Electrical panels, conduit, and wiring not associated with building equipment to remain
- Data wiring
- Plumbing fixtures (e.g., sinks, faucets, toilets, drinking fountains, etc.)
- Small-diameter water supply lines to plumbing fixtures
- Small diameter natural gas feed piping

In the warehouse area, the following examples of items/materials to be removed during demolition include:

- Data wiring
- Exposed insulation on perimeter walls and ceiling fire breaks

- Fluorescent task lighting fixtures, and associated conduit and wiring
- Electrical panels, conduit, and wiring not associated with building equipment to remain
- Messenger system and associated ducts
- Caulk around door and window frames
- Restrooms in the former sortation area (southeastern portion of the warehouse)
- Small-diameter water feed lines to plumbing fixtures
- Bollards and railings (cut off at floor level)
- Security system and associated wiring
- Compressor piping
- Pre-manufactured foam inserts in wall siding

Demolition debris will be managed as described in Section 6.

An estimated 2,500 to 5,000 square feet of yellow and orange floor marking paint is present at various locations throughout the building. This paint demarcated the various Walmart operational and product storage areas, walking aisles, and ingresses/egresses to the warehouse from offices, break rooms, and maintenance areas. This floor paint will be removed by scarification prior to performing the building decontamination work described in Section 5.

The following items will remain in place and be decontaminated; be removed, decontaminated, and replaced; or cleaned and encapsulated as described in Section 5 to the extent these are in a useable condition:

- Overhead sodium vapor lighting in the warehouse
- Main electrical panels, transformers, conduit and wiring, and high voltage cables (attached to main power source)
- Bay/overhead doors
- Dock levelers
- Area heaters in the warehouse and dock areas
- Electrical panels, conduit, wiring, feed lines, and duct work associated with overhead heaters in the warehouse and dock areas
- Dividing wall metal siding and insulation between the main warehouse and east warehouse
- Stairways and guard rails leading from the warehouse floor to the mezzanine levels above the office and shipping areas

5. Building Decontamination

5.1 Building Equipment Decontamination and Testing

The building materials to be decontaminated and reused and the methods for decontamination and testing are described below. These methods are submitted to EPA for approval consistent with 40 CFR Section 761.79(h). The target cleanup level for building equipment surfaces is less than

10 μg/100 cm^2 consistent with 40 CFR Section 761.79(b). The Quality Assurance Plan (QAPP) for confirmatory testing following cleaning is provided in Appendix B.

Warehouse Sodium Vapor Lighting

There are several large sodium vapor lights in the warehouse that provide general area lighting. These are located near the ceiling in the ceiling trusses. To remove the accumulated dust from the surfaces, the light fixtures will be thoroughly wiped down in place. This includes wiping down the outer surface and removing and wiping down the lens, the bulb, and area enclosed by the lens. The cleaning of the fixture will be done by wiping at least twice with a shop cloth dampened with a water and phosphate-free detergent solution and then rinsing the fixture twice with a clean shop cloth dampened with clean water. The shop cloths will be rinsed frequently and disposed after use on a fixture.

Following cleaning, each light fixture will be wipe sampled in accordance with 40 CFR 761.123. One wipe sample will be obtained from an outer surface of the fixture where dust was most likely to have accumulated. If the result exceeds the target cleanup concentration, the fixture either will be re-cleaned by repeating the wiping procedure until the target concentration is met or removed and discarded as TSCA waste. The lighting fixture also may be discarded as TSCA waste without testing or cleaning.

Associated conduit will be power washed as described above or by the power washing technique described in Section 5.2.

Dividing Wall Siding

There is a north-south oriented wall dividing the main warehouse from the eastern warehouse where former waste sorting and rack storage areas were located. The lower portion of this wall is constructed of concrete blocks and painted white, while the upper portion of the wall is double-sided sheet metal siding with a fiberglass insulation layer sandwiched between the two layers of sheet metal. Any exposed fiberglass insulation will be removed and disposed. Otherwise, the wall will be power washed on both sides and tested as described in Section 5.2.1 and 5.2.2. The concrete block portion of the dividing wall will be sealed in accordance with Section 5.3.

Electrical and Area Heating Equipment

Electrical equipment to remain in place such as electrical panels, transformers and overhead heaters in the warehouse and dock areas will be cleaned in place. The first step before the work is initiated will be to have a licensed electrician verify that all potential feeds to the equipment are secured using lock-out, tag-out procedures and the equipment is de-powered and safe for cleaning. A HEPA vacuum will be used to remove loose dust accumulations on the surfaces and in corners. The interior of the equipment also will be vacuumed to the extent it is readily accessible without any significant disassembly (i.e., such as through an access panel).

Following HEPA vacuuming, the equipment surfaces will be wiped down at least twice with a shop cloth dampened with a water and phosphate-free detergent solution and then rinsed twice with a clean shop cloth dampened with clean water. This includes thoroughly wiping down the exterior and any easily accessible interior surfaces. For example, switchgear inside the electrical panels will be wiped down to remove any accumulated dust that was not removed by vacuuming. The shop cloth will be rinsed frequently and disposed after use on an individual piece of equipment.

Conduit containing electrical wiring extending vertically from the panel to the ceiling and from the panel to the floor also will be cleaned using the procedure described above. Horizontal runs of conduit along the walls and ceiling will be cleaned using the power washing techniques described in Section 5.2.

Following cleaning, one wipe sample will be obtained from each piece of electrical equipment where dust was most likely to have accumulated and is likely to be contacted during future use. If the result exceeds the target cleanup concentration (10 μg/100 cm^2), the equipment either will be re-cleaned by repeating the wiping procedure until the target concentration is met or removed and discarded as TSCA waste.

Overhead Doors

There are over 30 overhead access doors that provide access to the structure. These are primarily located in the truck dock area along the south wall. However, overhead doors of various sizes are located in other locations. The surfaces of the doors and ancillary components (e.g., door rails, etc.) will be cleaned in place by mechanically scrubbing with a scrub brush as necessary then wiping down at least twice with a shop cloth dampened with a water and phosphate-free detergent solution. Double rinsing will be completed by wiping with a shop cloth dampened with clean water. The shop cloth will be rinsed frequently and disposed after the first wipe down and after use on each door or as needed. Care will be taken to also clean between each door panel. Abrasive techniques such as brushing or scraping may be used as needed to remove material.

Following cleaning, one wipe sample will be obtained from the surface that faces the building interior. If the result exceeds the target cleanup concentration, the equipment either will be re-cleaned by repeating the scrubbing/wiping procedure until the target concentration is met or removed and discarded as TSCA waste. Depending on its condition, an overhead door also may be discarded as TSCA waste without testing or cleaning; or removed, characterized and properly disposed based upon the analytical testing results.

Dock Levelers

Dock levelers will also be cleaned following removal of bulk particulates by a combination of HEPA vacuuming or wet sweeping and wiping. Accessible surfaces of the dock levelers will be mechanically scrubbed with a scrub brush as necessary and wiped down at least twice with a shop cloth dampened with a water and phosphate-free detergent solution. Double rinsing will be completed by wiping with a shop cloth dampened with clean water. The shop cloths will be rinsed frequently and disposed after the first wipe down and after use on a piece of equipment. Abrasive techniques such as brushing or scraping may be used as needed to remove material.

Following cleaning, one wipe sample will be obtained from the surface of each dock leveler. If the result exceeds the target cleanup concentration, the equipment either will be re-cleaned by repeating the scrubbing/wiping procedure until the target concentration is met or discarded as TSCA waste.

5.2 Building Decontamination and Testing

The building hard surfaces to be decontaminated and the methods for decontamination and testing are described below. These methods are submitted to EPA for approval consistent with 40 CFR Section 761.79(h). The target cleanup level for building surfaces is less than 10 μg/100 cm^2

consistent with 40 CFR Section 761.79(b). The QAPP for confirmatory testing following cleaning is provided in Appendix B.

5.2.1 Building Decontamination

The entire concrete floor slab, building walls, and ceiling will be cleaned by high-pressure, low-volume power washing using water amended with phosphate-free surfactant. Surfactant washing will be followed by a water-only rinse. Prior to power washing, gross dust accumulated during demolition will be removed with a HEPA vacuum or wetted and swept/scraped. Contractors will divide interior spaces into convenient and manageable work zones of no more than approximately 2,000 ft^2. Each work zone will be isolated with plastic sheeting hung from the ceiling and secured to the floor to provide containment of water and prevent contamination of surrounding clean areas. Power washing will begin at ceiling/trusses/beams and work down to the floor, ensuring that floor cracks and joints are thoroughly cleaned.

Wash water will be removed from the floor using squeegees and wet/dry vacuums and placed in polyethylene storage tanks for treatment and recycling. The wash water will be decontaminated using an on-Site carbon treatment system and placed in a treated water storage tank for testing and re-use. The treated water in the storage tank will be sampled for PCBs to ensure that the concentration is at or below 3 micrograms per liter (μg/L) per 40 CFR Part 761.79(a)(6)(b)(1)(ii). This treated water will be recycled for use in power washing the building. Treated water with PCB concentrations above 3 μg/L either will be re-treated until the concentrations are below 3 μg/L or staged in separate storage tanks for disposal.

Although not common in the structure, oily areas of floor or walls are known to exist in small isolated locations beneath former conveyor motors, trash compactors, and the air compressor. Where encountered, these areas will be cleaned using the double wash/rinse procedure described in 40 CFR 761 Subpart S process to ensure effective removal of PCBs.

5.2.2 Post Cleanup Testing

Post-cleanup confirmation samples will be collected from dock levelers, concrete floor surfaces, metal/fiberglass walls, unpainted ceiling, trusses, and un-encapsulated portions of support columns. Confirmation sampling will not be conducted on surfaces such as painted walls and columns that are to be encapsulated as described in Section 5.3. Confirmation samples will consist of wipe samples in accordance with 40 CFR 761.123 and the QAPP.

Confirmation wipe samples will be collected and analyzed for PCBs at the frequencies described below:

- From the surface of the floor at a rate of one sample per 1,000 ft^2 of floor area
- From the surface of non-encapsulated vertical walls at a rate of one sample per 1,000 ft^2 of wall area
- From the surfaces of ceiling trusses and horizontal support beams at a rate of one sample per 1,000 ft^2 of ceiling area
- From the surfaces of vertical support columns at a rate of one per column above the encapsulated area

If confirmatory sample results indicate that PCBs remain on the surfaces at concentrations of 10 μg/100 cm^2 or greater, a second iteration of power washing will be conducted in accordance with the procedure detailed in Section 5.2.1 and then the area will be re-sampled as described above to verify that cleanup levels were achieved. Containment sheeting will not be removed until verification sampling is completed and the area meets the cleanup objective.

5.3 Encapsulation

5.3.1 Wall and Column Paint

GHD estimates that approximately 25,000 square feet of painted wall and column surfaces are present within the warehouse. Any loose paint on building support columns and concrete block walls will be removed by mechanical scraping or wire brushing and will be managed as TSCA-regulated waste. Paint will remain on concrete block walls and support columns after power washing and will be encapsulated consistent with 40 CFR 761.30(p) using two solvent and water repellant coatings. The two coats will be of contrasting colors to allow for a visual indication of wear through per 40 CFR 761.30(p)(iii)(A)(1).

Generally, support columns have been coated with PCB-containing yellow warning paint or red paint to identify columns where fire extinguishers were mounted. The yellow paint extends to a level of between 8 and 10 feet above the floor while the red paint extends to within a couple of feet of the ceiling. The support columns will be encapsulated to a level above the existing yellow or red paint present on the column. The metal staircases and railings leading from the warehouse floor to the mezzanine levels above the office/breakrooms and shipping office are painted yellow and also will be scraped or wire brushed to remove loose paint and encapsulated.

Post cleanup samples of encapsulated surfaces are not necessary and will not be collected.

5.3.2 Floor Expansion Joint

Based on GHD's inspection of the building, the floor expansion joint material is predominantly intact and lies below floor level thus is of little concern relative to potential human exposure to PCBs contained in this material. Therefore, GHD proposes to encapsulate floor expansion joints with a solvent and water repellant epoxy sealant. Prior to encapsulation, floor paint and any loose floor expansion joint material will be removed and power washed as described in Section 5.2.1. If areas where expansion joint is found to lie above the floor level are observed, this material either will be removed if it is loose or cut back below floor level. An epoxy sealant will be applied over expansion joints to encapsulate them in place. Post cleanup samples will not be collected.

5.4 Modifications

During the course of the work, situations may be encountered that require modification of the procedures in the Work Plan or that may not be fully addressed in this Work Plan. Therefore, a contingency needs to be established to effectively communicate and resolve these situations.

The following procedure will be followed if a modification to the Work Plan is required:

1. The On-Site Project Supervisor will advise the Project Manager of the situation encountered

2. The Project Manager will advise the designated representatives of the U.S. EPA and IDEM of the nature of the situation and the proposed solution in writing (electronic mail transmittals will be permitted)
3. The U.S. EPA and IDEM representatives will review the situation and proposed solution and contact the Project Manager as necessary to discuss
4. The designated representatives of the U.S. EPA and IDEM will advise the Project Manager within 5 business days whether the proposed solution is acceptable
5. If the proposed solution is unacceptable, the U.S. EPA and IDEM will suggest the specific modifications necessary to allow the work to proceed
6. Any final resolution(s) or additions to address these situations will be documented in the final report to the Agencies

6. Waste Management

6.1 Overview

Wastes that will be generated during the work will include demolition debris, dust from vacuuming and floor paint scarification, and cleaning-related wastes such as used shop rags, plastic sheeting, decontamination fluids, and personal protective equipment (PPE). A waste processing and staging area will be set up in the warehouse near the truck loading docks. This area will be isolated from the other portions of the warehouse and will be the last area to be decontaminated once the waste has been removed from the building. Wastes generated during the work will be directed to the waste staging area for segregation, testing, containerizing, and shipping. Waste storage containers such as rolloff boxes, drums, and tanks may be staged outside the building on paved areas as long as they are properly labeled as to content and the wastes are protected from the elements (i.e., kept covered except when access is required).

6.2 General Requirements

All waste containers will be properly labeled in accordance with applicable regulations. Only containers that are in good condition and will not allow waste materials to disperse during transportation will be utilized. Truck beds and roll-off boxes containing non-liquid solid wastes will be lined and securely covered with a tarp during transit from the Site.

Only transporters with valid operating licenses and permits using vehicles and equipment meeting Department of Transportation (DOT) requirements for the material being transported will be used. Only properly trained personnel for the preparation, offering, and transportation of hazardous materials when required in conformance with the requirements of 49 CFR Subchapter C will be utilized.

Transportation shipments will be marked and placarded and include the required paperwork (i.e., manifests, bills of lading, etc.) in accordance with federal, state, and local regulations as applicable. Transport vehicle operators will be trained and licensed in conformance with federal, state, and local regulations applicable to the waste streams to be transported.

6.3 Management of Waste Streams

6.3.1 Demolition Debris

Non-ACM Demolition Debris

Demolition waste will be segregated by type and staged in appropriate containers for profiling. In general, demolition debris that can be profiled by bulk samples (i.e., wallboard, carpeting, drop ceiling tiles, etc.) will be separated from materials that cannot be profiled by bulk sample techniques (i.e., duct work, piping, metal studs, plumbing fixtures, etc.). Each type of demolition waste may then be further segregated by waste type or properties. For example, wallboard, ceiling tile, and carpeting may be staged in separate rolloff boxes for ease of bulk sampling and waste management flow, as it is expected that these wastes will be removed at once at different times.

Generally, a minimum of one sample will be obtained for every 10 cubic yards of bulk material to be disposed, which amounts to two samples per every 20 cubic yard rolloff box or one sample per every 10 drums. The number of samples may increase if the material is not homogeneous in order to properly characterize the different materials in a container. Data cables/wiring, electrical wiring, and metal studs will not be sampled and will be managed as PCB bulk product waste and disposed on in a permitted non-hazardous waste landfill consistent with 40 CFR Part 761.62.

Bulk sampling of demolition debris will be preferred where practical. However, wastes that are not amenable to bulk sampling will be profiled by wipe sampling. Waste that contains PCBs at concentrations of 50 mg/kg or greater (or wastes discarded with surface concentrations greater than 10 μg/100 cm^2) will be disposed of at an authorized Resource Conservation and Recovery Act (RCRA) Subtitle C or TSCA-authorized disposal facility. Otherwise, demolition debris will be disposed of at an authorized Subtitle D disposal facility.

ACM Demolition Debris

ACM-demolition debris will be tested for PCBs in a manner similar to the non-ACM demolition debris but will remain segregated from the non-ACM material. ACM debris containing co-mingled PCBs at a concentration above 50 mg/kg in bulk samples or greater than 10 μg/100 cm^2 in wipe samples will be managed at a TSCA disposal facility. If the PCB concentrations are below 50 mg/kg in bulk samples or below 10 μg/100 cm^2 in wipe samples, the ACM debris will be disposed of at an authorized Subtitle D facility authorized to accept ACM. Container and handling requirements for ACM will be adhered to for both TSCA and non-TSCA ACM waste.

6.3.2 Floor Paint and Dust

Floor paint and dust removed from the building by scarification, sweeping, and HEPA vacuuming will be segregated and tested using bulk sampling techniques. Paint and dust that contain PCBs at concentrations of 50 mg/kg or greater will be disposed of at a RCRA Subtitle C or an authorized TSCA disposal facility. Otherwise, the waste will be disposed of at an authorized Subtitle D disposal facility.

6.3.3 Cleaning-Related Wastes

Wash and Rinse Water

Spent wash/rinse water will be treated to less than or equal to 0.5 μg/L to allow for unrestricted disposal as a non-TSCA wastewater per 40 CFR 761.79(b). To verify achievement of decontamination objectives, decontamination water will be staged in dedicated clean storage tanks and sampled at a rate of one sample per tank or one for every 5,000 gallons, whichever is less. Upon confirmation that the PCB concentrations in the wash water are less than or equal to 0.5 μg/L, the wash water will be disposed as non-TSCA waste either by discharge to the City of Indianapolis sanitary sewer system or transport to an off-Site disposal facility.

Spent Carbon and Filters from Wash Water Treatment

Spent carbon and water treatment filters will be segregated and tested using bulk sampling techniques. Spent carbon and filters that contain PCBs at concentrations of 50 mg/kg or greater will be disposed of at a RCRA Subtitle C or an authorized TSCA disposal facility. Otherwise, the waste will be disposed of at an authorized Subtitle D disposal facility.

The wash water treatment system will be decontaminated in accordance with 40 CFR 761.79. Poly tanks will be drained, cut-up, and disposed as non-TSCA waste.

Cleaning Solvents

Cleaning solvents used for PCB decontamination are expected to be minimal and will be drummed and disposed as TSCA regulated waste.

Personal Protective Equipment (PPE) and Shop Rags

PPE expected to be used during the work including disposable protective (e.g., Tyvek) suits, gloves, dust masks, boot covers, and tape and shop rags used for cleaning will be disposed of as a non-TSCA waste consistent with Section 761.61(a)(5)(v)(A) of the TSCA rules.

7. Health and Safety

A detailed Site-specific Health and Safety Plan (HASP) including Job Safety Analyses for each work task to be performed, and applicable training, respirator fit test, and license documentation for personnel completing the work will be prepared.

Among the topics to be addressed by the HASP include, but are not necessarily limited to:

- Asbestos awareness and management
- Fall protection
- Hazard communication
- PPE
- Hazardous energy control
- Air monitoring
- Daily safety meetings

- Site control (work zone demarcation, security, decontamination procedures, etc.)
- Emergency procedures and incident management

The Site work will be completed in accordance with OSHA 1910.120 Hazardous Waste Operations and Emergency Response.

8. Reporting

Upon completion of the building decontamination activities, a final report will be prepared and submitted to the U.S. EPA and IDEM. The final report will include a description of the cleanup activities, a photographic log of cleanup work, a discussion of any difficulties encountered and resolution, description of sampling procedures, presentation and discussion analytical results, waste management and disposal activities and records, and conclusions on the efficacy of the work. The final report also will include an operation and maintenance plan for encapsulated areas of the Site.

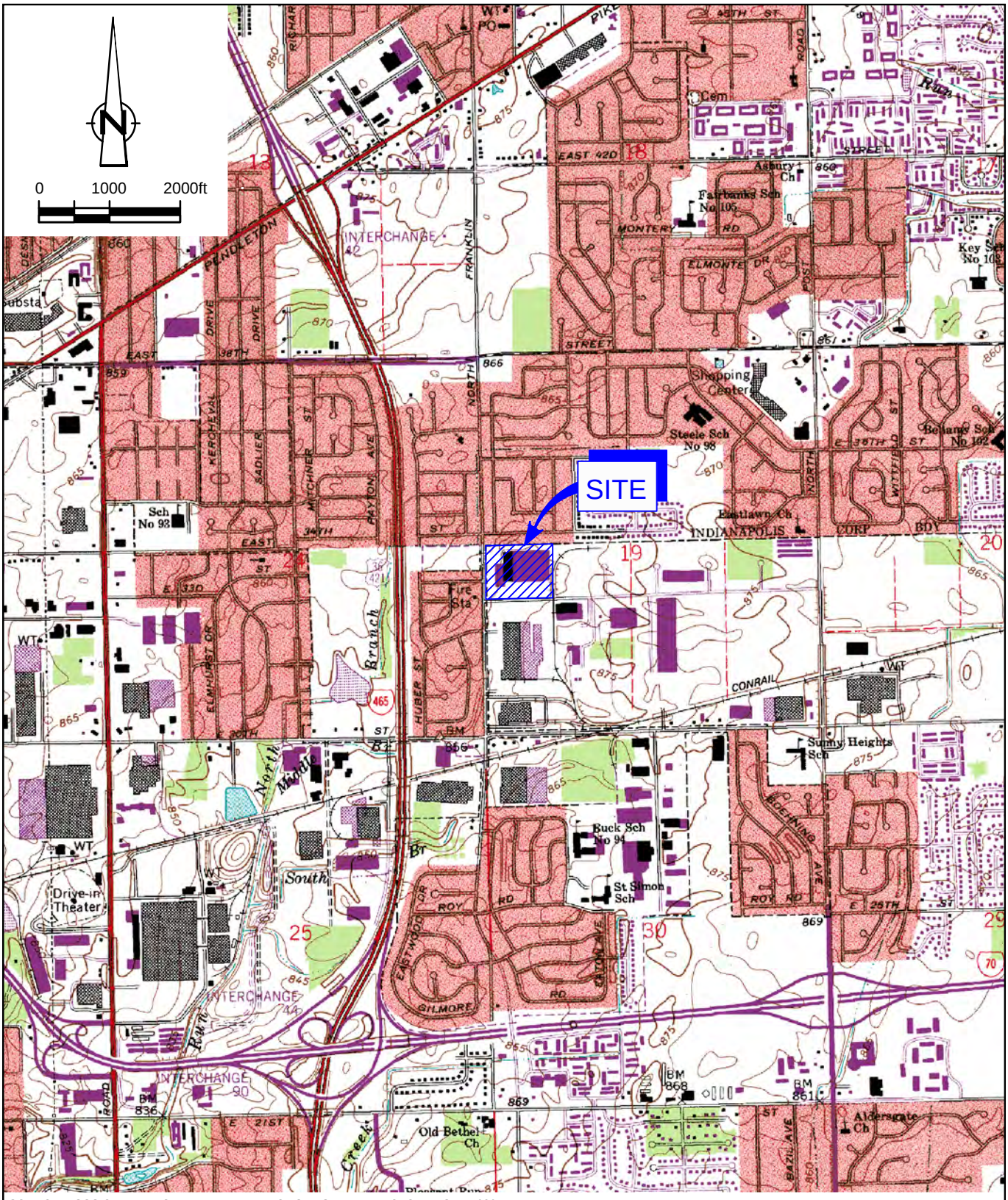
9. Anticipated Cleanup Schedule

Remedial action activities are anticipated to follow the following schedule (following approval of the Work Plan):

- Bid Document Preparation and Review – 3 weeks
- Contractor Selection/Award – 3 weeks
- Contractor Mobilization – 2 weeks following contract award
- Site Remedial Activities – 6 to 9 months following contract award
- Report – 8 weeks following completion of Site Cleanup/Water Decontamination

A detailed project schedule will be developed in consultation with the cleanup contractor following bid award.

Figures



SOURCE: USGS QUADRANGLE MAP; INDIANAPOLIS EAST, IND., PHOTOREVISED 1980.

figure 1

SITE LOCATION
3333 NORTH FRANKLIN ROAD
Indianapolis, Indiana

GHD

089064-03(003)GN-DE001 OCT 5/2015

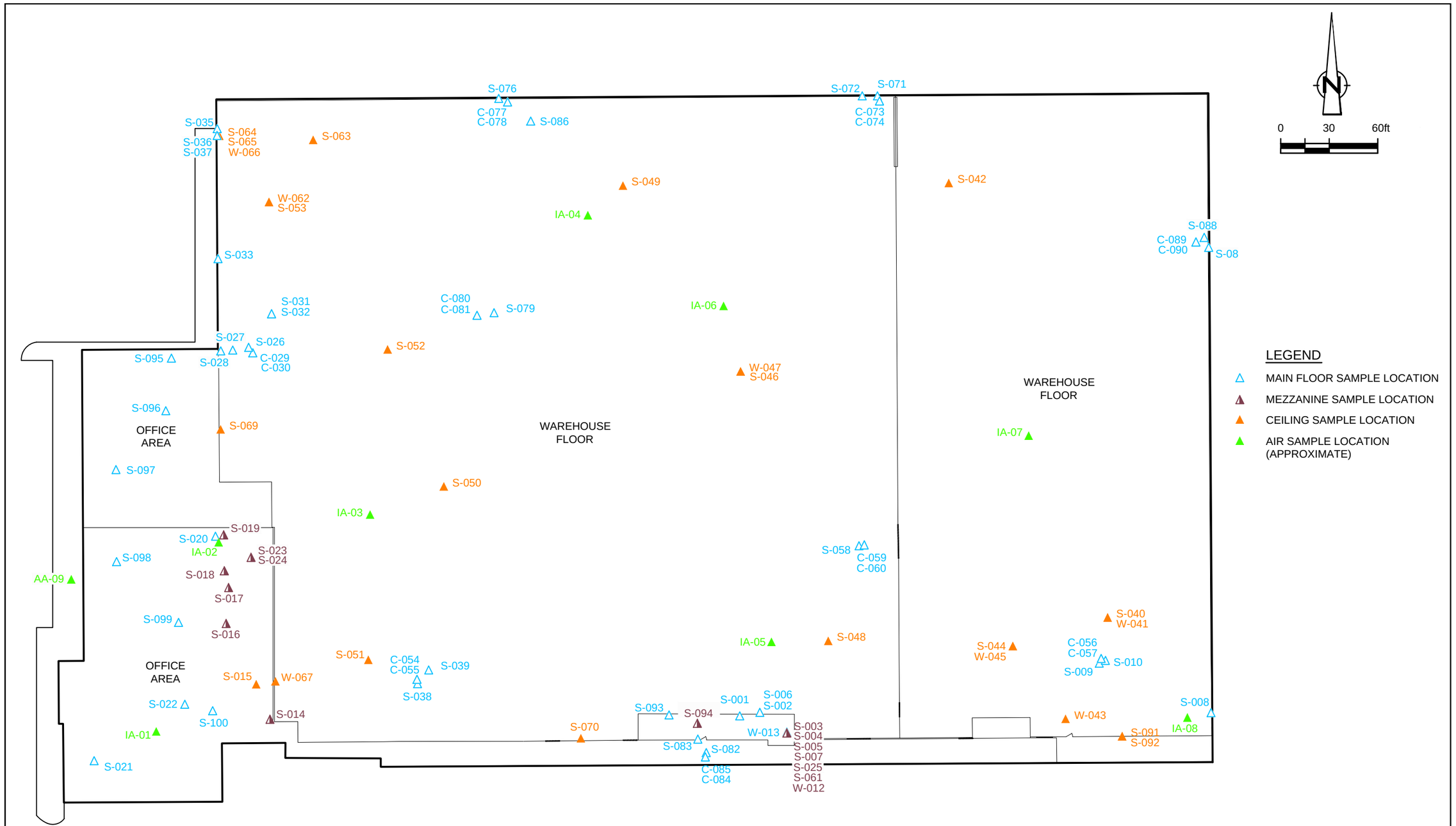


figure 2

SITE PLAN AND SAMPLE LOCATIONS
3333 NORTH FRANKLIN ROAD
Indianapolis, Indiana

SOURCE: MILLER SURVEYING INC., SURVEY DATED 10/8/2014
(INDIANA EAST SP NAD83 US SURVEY FEET).

Appendices

Appendix A
September 15, 2015 Photo Log

Photo 1 – View looking east near the southwest entrance to the main warehouse.

Photo 2 – View looking northeast near the southwest entrance to the main warehouse.

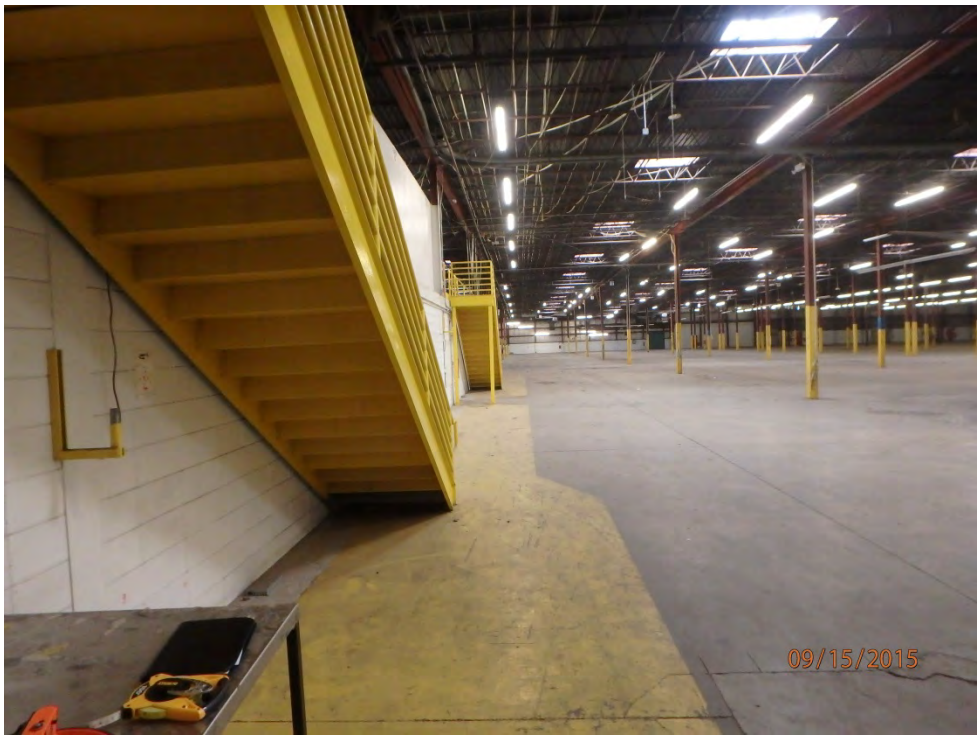


Photo 3 – View looking north near the southwest entrance to the main warehouse. Office and break rooms are located to the left (west).

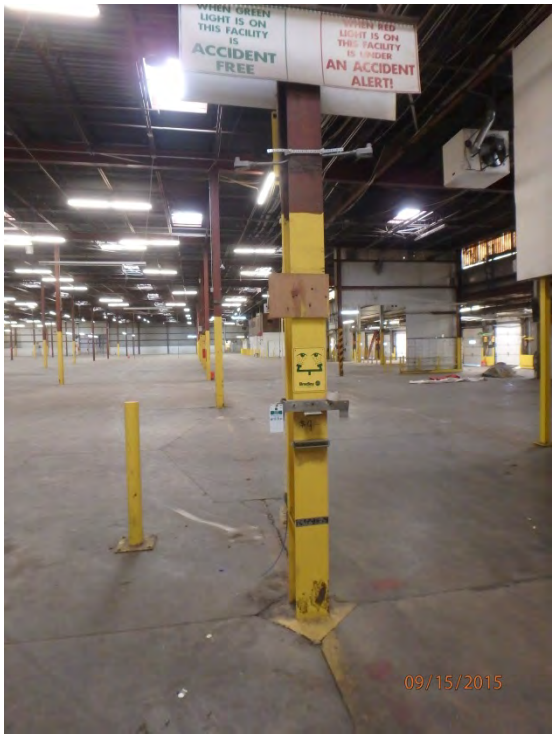


Photo 4 – View of support column near southwest main warehouse entrance. Note most columns have yellow paint up to approximately 8 feet.

Photo 5 – View looking southwest near southwest corner of the main warehouse of elevated storage area.

Photo 6 – View from the southwest corner of the main warehouse looking west at break rooms and elevated office.

Photo 7 – Typical painted bollard. Note yellow paint on columns and faint orange paint stripe on the floor formerly demarcating Walmart storage areas.

Photo 8 – Looking west in the southwest corner of the main warehouse at an elevated HVAC unit near the ceiling. Note ductwork and cabling.

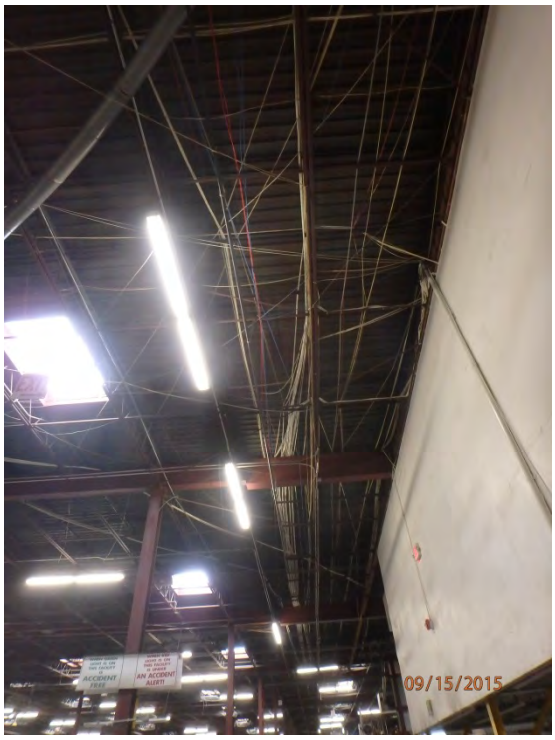


Photo 9 – View of ceiling of cabling near southwest corner of main warehouse.

Photo 10 – Typical doorframe between main warehouse and loading dock on the south side of the structure. Caulk is present along doorframe.

Photo 11 – Looking west at concrete block wall painted white near southwest corner of the main warehouse.

Photo 12 – Looking north at concrete block wall between main warehouse and loading dock.

Photo 13 – View of cabling and HVAC unit near ceiling in southwest corner of the main warehouse.

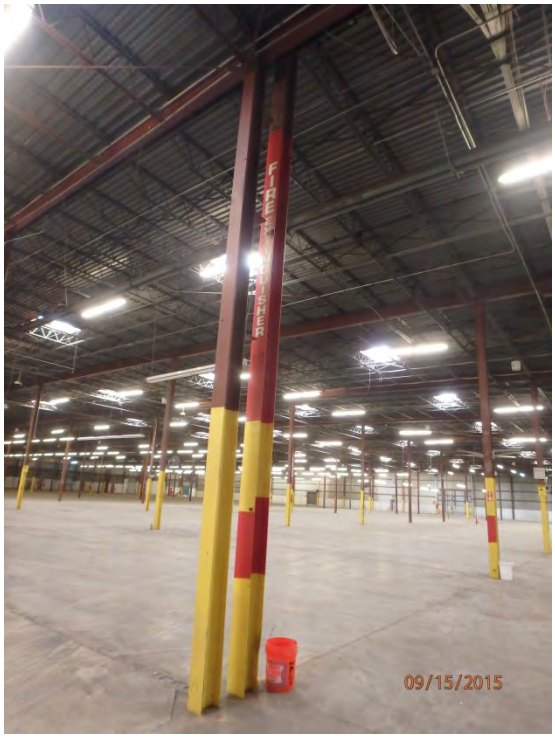


Photo 14 – Looking northeast at a column with additional red paint. Column on the left is typical while the column on the right has additional red painted surface.

Photo 15 – Looking southeast at dock leveler present adjacent to overhead door.

Photo 16 – Looking southeast at dock leveler present adjacent to overhead door.

Photo 17 – View of heater, door rails and lighting in the dock area on the south side of the building.

Photo 18 – View looking west of electrical panels and conduit on a wall near the loading dock in the southwestern portion of the structure.

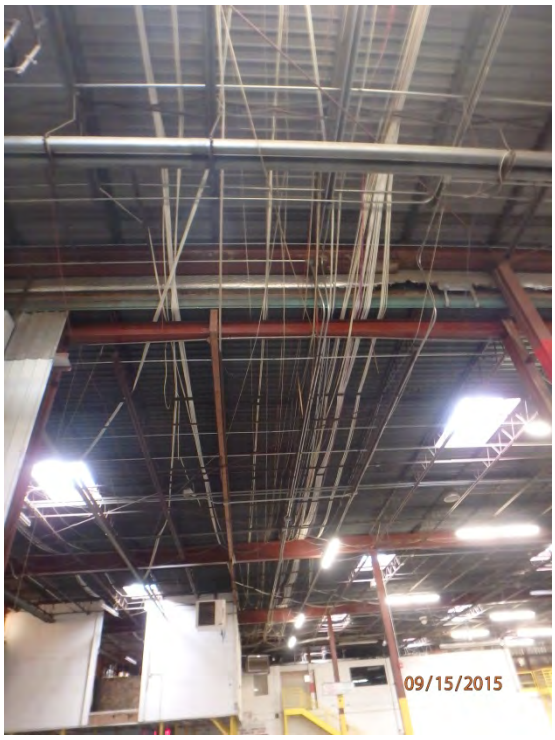


Photo 19 – Overhead view of lighting, cabling and ductwork near ceiling in southwestern corner of the main warehouse.

Photo 20 – View of water service line in the south-central portion of the main warehouse.

Photo 21 – View of the same water service line looking towards the ceiling.

Photo 22 – Typical overhead doors in the dock area on the south side of the building.

Photo 23 – View of ceiling in the dock area. Note painted walls. There are 29 dock doors on the south side of the building.

Photo 24 – View of the shipping office looking west in the south-central portion of the main warehouse. Shipping office measures approximately 16 feet wide by 97 feet in length.

Photo 25 – View looking south of electrical panels and conduit on shipping office wall.

Photo 26 – Another view of shipping office looking southeast.

Photo 27 – View of floor adjacent to column near shipping office. Note orange and yellow paint on the floor and floor expansion joints.

Photo 28 – A view of the floor looking west at orange paint stripes added to demarcate storage areas.

Photo 29 – View looking southeast at water service lines located on wall between main warehouse and south dock.

Photo 30 – Looking southwest at electrical components on the wall between the main and eastern warehouses in the southeastern portion of the building.

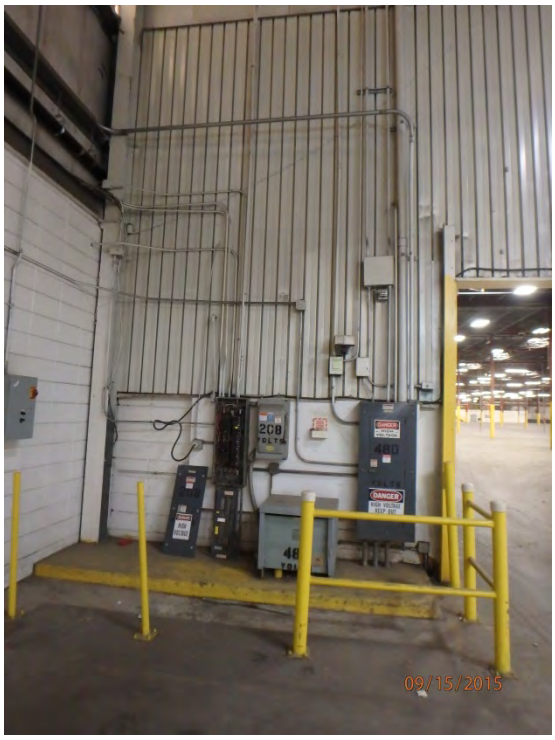


Photo 31 – Looking west at same electrical components as shown in Photo 30.

Photo 32 – Looking east along the south wall between eastern warehouse and loading dock in the eastern portion of the building. Note debris on the floor.

Photo 33 – View of restrooms in the eastern warehouse near former salvage area in the southeastern corner of the building.

Photo 34 – View looking northeast of wall separating the eastern warehouse area from the main warehouse.

Photo 35 – View of the southeastern corner of the eastern warehouse in former salvage area. Note yellow and white floor paint and water service lines and electrical components on the walls. Walls are painted white.

Photo 36 – View of typical door frame located between the dock and salvage area in southeastern corner of the building.

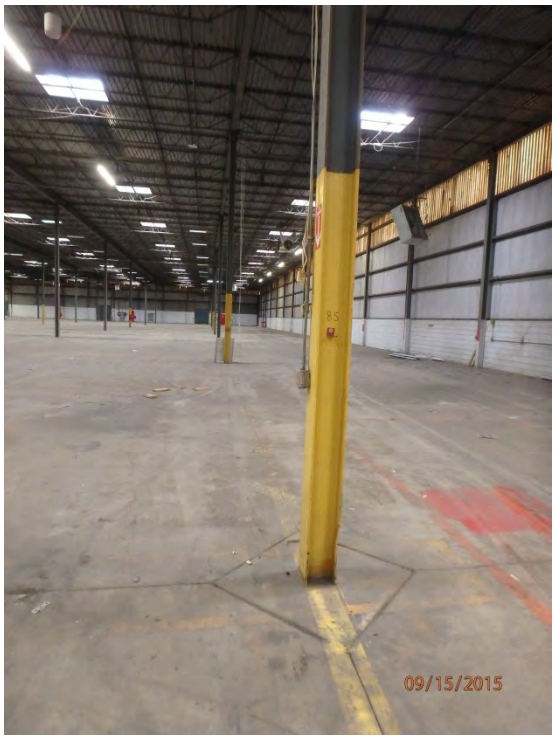


Photo 37 – View looking north along eastern wall of the eastern warehouse.

Photo 38 – View of floor joints around a column in the eastern warehouse.

Photo 39 – View of eastern outside wall in the eastern warehouse showing steel siding above concrete block.

Photo 40 – Floor joint material in a floor joint near a support column.

Photo 41 – View of floor joints around same column as Photo 40.

Photo 42 – View of joint between north outside wall and floor. Note floor joint material between floor and wall.

Photo 43 – Electrical equipment along north wall of building in the eastern warehouse. Note fire door and overhead door on either side of electrical equipment.

Photo 44 – Concrete block foundation on floor between eastern warehouse from the main warehouse.

Photo 45 – View of steel siding above the concrete block wall separating the eastern warehouse (left) from the main warehouse (right). Note dusty insulation material sandwiched between the steel panels.

Photo 46 – Another view of steel panels and insulation.

Photo 47 – Another view of steel panels and insulation looking into the eastern warehouse.

Photo 48 – Painted concrete block wall along north wall of main warehouse.

Photo 49 – View of former rack storage in the eastern warehouse looking east.

Photo 50 – View of floor in the main warehouse just west of the wall separating the eastern warehouse from the main warehouse. Note heavy dust accumulation on the floor.

Photo 51 – Looking northeast at the gap between the eastern and main warehouses and dusty floor conditions.

Photo 52 – More dust and debris on main warehouse floor near the north wall.

Photo 53 – Looking south at heavy dust accumulation on main warehouse floor in former sorting area.

Photo 54 – Similar view as Photo 53 but looking southwest across former sorting area.

Photo 55 – Overhead door on north wall inside main warehouse. Note the level of white paint and heavy dust accumulation on the floor in former sorting area.

Photo 56 – Debris and dust on floor along north wall of main warehouse in former sorting area.

Photo 57 – Looking southeast ah heavy dust accumulation on main warehouse floor. This is the former sorting area.

Photo 58 – Looking west along former conveyor line near northern wall of the main warehouse. Note overhead utilities and ductwork.

Photo 59 – View of northern wall at insulation and overhead structures.

Photo 60 – View of insulation material above concrete block along northern wall.

Photo 61 – Area of staining on the floor near the former trash compactor in the northwestern corner of the warehouse looking south.

Photo 62 – Area of staining on the floor near along the former conveyor line in the northwestern corner of the warehouse looking west.

Photo 63 – Area of staining and debris on the floor near the former trash compactor and conveyor in the northwestern corner of the warehouse looking west.

Photo 64 – View of western wall near the former air compressor in the northwest corner of the warehouse.

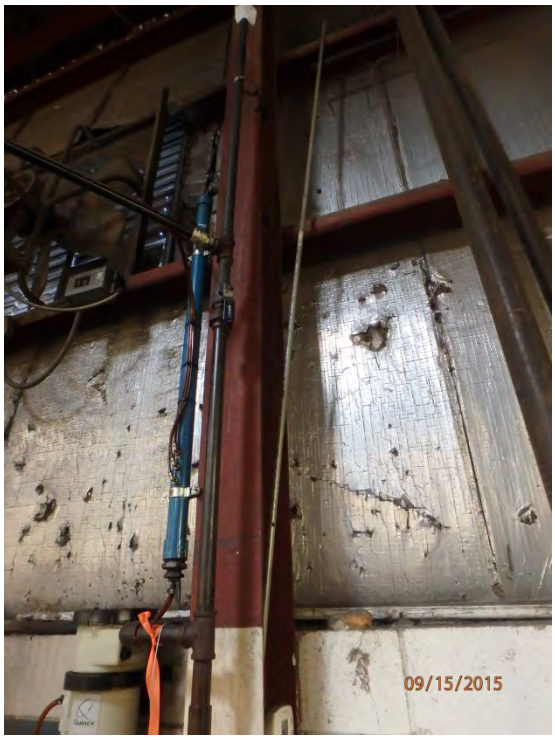


Photo 65 – View of piping on west wall formerly connected to the air compressor.

Photo 66 – View looking south along west wall of warehouse towards former battery charging area.

Photo 67 – View of floor joints and debris near western wall of warehouse.

Photo 68 – View looking south across former battery charging area along the western wall.

Photo 69 – View of eroded floor located beneath former battery charging area.

Photo 70 – View looking north at eroded floor located beneath former battery charging area.

Photo 71 – View looking west inside office area.

Photo 72 – View looking east at former vending machine area inside the break room.

Photo 73 – View through ceiling panels in the janitor's closet in break room area at concrete decking that provides the floor of the overhead offices.

Photo 74 – Damaged floor area near southwestern corner of warehouse.

Appendix B
Quality Assurance Project Plan

Building PCB Decontamination Work Plan
Appendix B
Quality Assurance Project Plan

Indianapolis Return Center
3333 North Franklin Road
Indianapolis, Indiana

DLA Piper, LLP

GHD | 6520 Corporate Drive Indianapolis Indiana 46278
089064 | Report No 4 | January 20 2016

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Attachments

QAPP Distribution List

Title/Organization	*Number of Copies*
Representative – U.S. EPA Region 5	1
Representative – IDEM	1
Owner Representative – DLA Piper, LLP	1
Project Manager – GHD	1
QA Officer – GHD	1
Sample Team Leader – GHD	1
Laboratory Operations Manager – TAL-Canton	1
Laboratory Project Manager – TAL-Canton	1
Laboratory QA Officer – TAL-Canton	1

List of Acronyms and Abbreviations

DQOs	-	Data Quality Objectives
EDD	-	Electronic Data Deliverable
GHD	-	GHD Services Inc.
IDEM	-	Indiana Department of Environmental Management
IRC	-	Indianapolis Return Center
LCS	-	Laboratory Control Sample
LIMS	-	Laboratory Information Management System
MDL	-	Method Detection Limit
MS/MSD	-	Matrix Spike/Matrix Spike Duplicate
NELAP	-	National Environmental Laboratory Accreditation Program
PARCCS	-	Precision, Accuracy, Representativeness, Comparability, Completeness, Sensitivity
PCBs	-	Polychlorinated Biphenyls
QA	-	Quality Assurance
QA/QC	-	Quality Assurance/Quality Control
QAPP	-	Quality Assurance Project Plan
QC	-	Quality Control
RPD	-	Relative Percent Difference
RSD	-	Relative Standard Deviation
SAP	-	Sampling and Analysis Plan
SDG	-	Sample Delivery Group
Site	-	Indianapolis Return Center, 3333 North Franklin Road, Indianapolis, Indiana
SOP	-	Standard Operating Procedure
SW-846	-	"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA SW-846, 3rd Edition with Updates I through IIIB
TAL-Canton	-	TestAmerica Laboratories, Inc., North Canton, Ohio
U.S. EPA	-	United States Environmental Protection Agency
Work Plan	-	"Building PCB Decontamination Work Plan, Indianapolis Return Center, 3333 North Franklin Road, Indianapolis, Indiana" and "Addendum 1 to the Building PCB Decontamination Work Plan, Indianapolis Return Center, Indianapolis, Indiana"

1. Introduction

A Quality Assurance Project Plan (QAPP) is an essential part of any environmental project. The QAPP is a planning document that provides a "blueprint" for obtaining the type and quantity of data needed to support environmental decision making. The QAPP integrates all technical and quality aspects of a project and documents all quality assurance (QA), quality control (QC) and technical activities and procedures associated with planning, implementing and assessing environmental data collection operations.

This QAPP has been prepared by GHD Services Inc. (GHD), at the request of DLA Piper, LLP in accordance with the Indiana Department of Environmental Management (IDEM) Office of Land Quality technical guidance document titled "Quality Assurance Project Plan - Guidance" (May 4, 2015) and the United States Environmental Protection Agency (U.S. EPA) guidance documents titled "EPA Requirements for Quality Assurance Project Plans", EPA QA/R-5 (EPA/240/B-01/003, March 2001) and "Guidance for Quality Assurance Project Plans", EPA QA/G-5 (EPA/240/R-02/009, December 2002). As specified in these documents, there are four basic groups of elements that must be included in a QAPP. These four groups and associated elements are summarized as follows.

- Group A - Project Management. The elements in this group address the basic area of project management including the project history and objectives, and the roles and responsibilities of the participants.
- Group B – Data Generation and Acquisition. The elements in this group address all aspects of project design and implementation. Implementation of these elements ensures that appropriate methods for sampling, measurement and analysis, data collection or generation, data handling and QC activities are employed and are properly documented.
- Group C – Assessment/Oversight. The elements in this group address the activities for assessing the effectiveness of the implementation of the project and associated QA and QC activities. The purpose of assessment is to ensure that the QAPP is implemented properly.
- Group D – Data Validation and Usability. The elements in this group address the QA activities that occur after the data collection phase of the project is completed and ensure the data achieve the project objectives.

The above four groups and associated elements are documented in this QAPP for the remediation activities to be conducted at the former Walmart Indianapolis Return Center (IRC) building located at 3333 North Franklin Road in Indianapolis, Indiana (Site). The remediation activities address the decontamination of polychlorinated biphenyls (PCBs) from the Site as described in "Building PCB Decontamination Work Plan, Indianapolis Return Center, 3333 North Franklin Road, Indianapolis, Indiana" and "Addendum 1 to the Building PCB Decontamination Work Plan, Indianapolis Return Center, Indianapolis, Indiana" (Work Plan). This QAPP is Appendix B of the Work Plan. The components of the sampling and analysis plan for the project are included in Section 3 and Attachment A of this QAPP.

2. Project Management

The responsibilities of management, QA personnel, field personnel and laboratory personnel are provided in the following subsections. Additionally, the organization of the project is presented to identify the lines of communication among the participants, and any special training/certification requirements for the project are identified.

2.1 Management Responsibilities

The project team for the remedial activities at the Site consists of technical personnel, QA personnel and project laboratory personnel. GHD will conduct or oversee all data collection activities at the Site. GHD's Project Manager is ultimately responsible for ensuring that the project objectives are achieved. GHD's Project Manager's specific responsibilities are summarized by the following.

Project Manager - GHD

- Technical liaison to client
- Oversight of field activities
- Oversight of laboratory activities
- Advise on corrective actions
- Preparing and reviewing reports
- Coordination of the GHD's technical group
- Final evidence file custodian
- Oversight of data review, validation, and usability

The project laboratory selected for the remedial activities is the North Canton, Ohio facility of TestAmerica Laboratories, Inc. (TAL-Canton). TAL-Canton will conduct the chemical analysis of all samples collected. TAL-Canton's Project Manager is responsible for ensuring that the project objectives are achieved by the laboratory. The Project Laboratory's Project Manager specific responsibilities are summarized by the following.

Project Manager – TAL-Canton

- Ensures all resources of the laboratory are available on an as-required basis
- Reviews completeness of final analytical reports
- Approves final reports prior to submission

U.S. EPA Region 5 may designate an individual to provide oversight for this project. If so, this individual would also be responsible for submitting this QAPP and any subsequent revisions or amendments to the appropriate EPA personnel for review and approval.

Similarly, IDEM may designate an individual to provide oversight of this project. If so, this individual would also be responsible for submitting this QAPP and any subsequent revisions or amendments to the appropriate IDEM personnel for review and approval.

2.2 Quality Assurance Responsibilities

Project team members with QA responsibilities include the GHD's QA Officer and TAL-Canton's QA Officer. The specific responsibilities of the project team QA officers follow.

Quality Assurance Officer – GHD

- Overview and review field QA/QC procedures
- Review laboratory QA/QC procedures
- Oversee data validation and data quality assessment
- Document field corrective actions, if necessary
- Advise on laboratory corrective action procedures
- Oversee verification of accuracy of field data transferred into spreadsheet format
- Oversee verification of accuracy of analytical database after data are imported
- Prepare and review QA reports
- QA representation of project activities

Quality Assurance Officer – TAL-Canton

- Coordinate and overview of internal laboratory systems audits
- Coordinate QA review of data deliverables
- Implement and document laboratory corrective actions, if required
- Technical representation of laboratory QA procedures and activities
- Oversee preparation of laboratory standard operating procedures (SOPs)

2.3 Field Responsibilities

GHD will conduct or oversee all field sampling and obtain field measurements related to the sampling effort being conducted. Specific procedures for field sample collection and field measurements are provided in Section 3 of this QAPP.

2.4 Laboratory Responsibilities

TAL-NC will perform the chemical analyses of all samples collected during the project. Specific information regarding the sampling and analysis program are provided in Section 2.7 and Table 2.1 of this QAPP.

The specific responsibilities of key laboratory personnel follow.

Operations Manager – TAL-Canton

- Coordinate laboratory analyses
- Supervise in-house chain-of-custody
- Schedule sample analyses
- Oversee data review
- Oversee preparation of analytical reports

Sample Custodian – TAL-Canton

- Receive and inspect the incoming sample containers
- Record the condition of incoming sample containers
- Sign appropriate documents
- Verify correctness of chain-of-custody documentation
- Notify laboratory Project Manager of any non-conformances identified during sample receipt and inspection
- Assign a unique identification number to each sample, and record client information and sample identification numbers in the sample receiving log
- Initiate transfer of the samples to appropriate laboratory sections
- Control and monitor access/storage of samples and extracts

2.5 Project Organization

The organization and lines of communication among the project participants identified in the preceding subsections are presented on Figure 2.1.

2.6 Project Definition/Background Information

This QAPP addresses the sampling and analysis program developed to obtain the data necessary to confirm that building surfaces remediated at the Site have met the cleanup requirements. In addition, if allowed by the local sanitary sewer authority, samples of decontamination wash water will be collected and analyzed to confirm that it can be disposed of in the local sanitary sewer. This QAPP does not address disposal characterization analyses, which vary by disposal firm and permit requirements.

Site background and setting information and previous data collection activities are summarized in Sections 1 and 2 of the Work Plan. Current building conditions from an inspection conducted on September 15, 2015 are provided in Appendix A of the Work Plan.

2.7 Project/Task Description

The scope of work is provided in Section 3 of the Work Plan. In general, the tasks involving data collection include collecting and analyzing confirmatory wipe and bulk concrete samples for polychlorinated biphenyls (PCBs) to ensure surface decontamination has met the cleanup objectives in the Work Plan and collecting and analyzing treated wash water for PCBs. Table 2.2 identifies the specific PCBs (Aroclors) and the required quantitation limits.

2.7.1 Project Schedule

The anticipated cleanup schedule is provided in Section 7 of the Work Plan. Though contingent on the approval of the Work Plan, data collection activities are anticipated to commence in early or mid-2016.

2.8 Quality Objectives and Criteria for Measurement Data

The process for developing quality objectives and measurement performance criteria for data obtained for the project is presented in the following subsections.

2.8.1 Data Quality Objectives

Data quality objectives (DQOs) are qualitative and quantitative statements derived from the outputs of each step of the DQO process. The DQO process is a series of planning steps based on the scientific method that is designed to ensure that the type, quantity and quality of environmental data used in decision making are appropriate for the intended application.

The seven steps in the DQO process follow.

1. Stating the problem
2. Identifying the goal of the study
3. Identifying information inputs
4. Defining the boundaries of the study
5. Developing the decision rule/analytic approach
6. Specifying error limits (performance or acceptance criteria)
7. Develop the plan (optimize the design) for obtaining data

The design of the anticipated sampling and analysis program provided in Table 2.1 was developed from information included in the Work Plan and the applicable regulatory requirements. The resulting DQO statements for the project are summarized below.

1. Problem	Determine if post-cleanup surface PCB concentrations meet regulatory requirements.
2. Decision	Are post-cleanup PCB concentrations from the analysis of standard wipe samples greater than 10 µg/100 cm^2?
3. Inputs	Data from the collection of standard PCB wipe samples (refer to Work Plan Section 5.2.2).

4. Boundaries	See Figure 3 of Work Plan.
5. Decision Rule	If sampling data identifies areas that exceed 10 µg/100 cm², a second iteration of power washing and post-cleanup sampling will be conducted (refer to Work Plan Sections 5.2.1 and 5.2.2).
6. Error Limits	Refer to QAPP Section 5.0 and SOPs.
7. Design	Best professional judgment (refer to Work Plan Sections 3 and 5).

1. Problem	Determine if post-cleanup concrete surface PCB concentrations meet regulatory requirements at seven (7) locations where PCBs were detected previously at concentrations > 1 mg/kg.
2. Decisions	Are post-cleanup PCB concentrations from the analysis of bulk concrete samples in the top 0.5 inches of concrete cores > 1 mg/kg? Are post-cleanup PCB concentrations from the analysis of a standard wipe sample collected adjacent to the concrete core location ≤ 10 µg/100 cm²?
3. Inputs	Data from the collection of bulk concrete and standard PCB wipe samples (refer to Work Plan Section 5.2.2).
4. Boundaries	See Figure 3 of Work Plan.
5. Decision Rule	If sampling data identifies bulk concrete PCB concentrations ≤ 1 mg/kg, the regulatory requirement has been met. If sampling data identifies bulk concrete PCB concentrations > 1 mg/kg and PCB concentrations from the analysis of the standard wipe sample collected adjacent to the concrete core location are ≤ 10 µg/100 cm² the regulatory requirement has been met. Otherwise, a second iteration of power washing and post-cleanup sampling will be conducted at that location (refer to Work Plan Section 5.2.2).
6. Error Limits	Refer to QAPP Section 5.0 and SOPs.
7. Design	Best professional judgment (refer to Work Plan Sections 3 and 5).

1. Problem	Determine if treated wash water can be recycled for power washing additional area of building.
2. Decision	Are post-treatment wash water PCB concentrations ≤ 3 µg/L?
3. Inputs	Data from the collection/analysis of treated wash water samples (refer to Work Plan Section 5.2.1).
4. Boundaries	See Figure 3 of Work Plan.
5. Decision Rule	If sampling data identifies the PCB concentration in treated wash water is ≤ 3 µg/L, it can be recycled for reuse; otherwise it will be retreated until the PCB concentration is ≤ 3 µg/L (refer to Work Plan Section 5.2.1).
6. Error Limits	Refer to QAPP Section 5.0 and SOPs.
7. Design	Best professional judgment (refer to Work Plan Section 5.2.1).

1. Problem	Determine if treated spent wash/rinse water can be disposed of as a non-TSCA wastewater.
2. Decision	Are treated spent wash/rinse water PCB concentrations ≤ 0.5 µg/L?
3. Inputs	Data from the collection/analysis of treated spent wash/rinse water samples and standards at 40 CFR 761.79(b) (refer to Work Plan Section 6.3).
4. Boundaries	See Figure 3 of Work Plan.
5. Decision Rule	If sampling data identifies the PCB concentration in treated wash water is ≤ 0.5 µg/L, it can be disposed of without restriction; otherwise it will be retreated until the PCB concentration is ≤ 0.5 µg/L or managed as regulated waste (refer to Work Plan Section 6.3).
6. Error Limits	Refer to QAPP Section 5.0 and SOPs.
7. Design	Best professional judgment (refer to Work Plan Section 6.3).

The planning team for the project consists of GHD's Project Manager and technical team. The decision makers are GHD's Project Manager in consultation with DLA Piper, LLP, IDEM and U.S. EPA. The DQO process ensures that the data collection program will be conducted in a resource-efficient and timely manner.

2.8.2 Measurement Performance Criteria

The measurement performance criteria for precision, accuracy, representativeness, completeness, comparability and sensitivity (PARCCS) are provided in the following subsections.

2.8.2.1 Field Precision Criteria

Precision of the field sample collection procedures will be assessed by the data from analysis of field duplicate samples for water samples. Field duplicate samples will be collected at a frequency of 1 per 20 or fewer investigative samples. A relative percent difference (RPD) of 50 percent will be used as an advisory limit for analytes detected in both the investigative and field duplicate water samples at concentrations greater than or equal to 5 times their quantitation limits.

Although a true field duplicate of a surface wipe sample cannot be collected, sampling precision will be assessed by the collection and analysis of a replicate surface wipe sample from an area adjacent to the original area wiped. These will be collected at a frequency of 1 per 20 or fewer wipe samples or one per day of sampling, whichever is less frequent. An RPD of 100 percent will be used as an advisory limit for analytes detected in both the original and replicate wipe samples at concentrations greater than or equal to 5 times their quantitation limits. The primary (original) sample result will be reported and the replicate result will be used for QC evaluation purposes only. GHD's data validator, in consultation with GHD's QA Officer, will use professional judgment to qualify associated sample data.

Field duplicate samples will not be collected for the concrete core sampling program.

2.8.2.2 Laboratory Precision Criteria

Laboratory precision will be assessed through the calculation of RPDs for laboratory duplicate sample analyses. These will be matrix spike/matrix spike duplicate (MS/MSD) for bulk concrete and water samples and duplicate laboratory control samples (LCS/LCSD) for wipe samples. If insufficient bulk concrete sample is available for an MS/MSD to be analyzed, LCS/LCSD analysis will be requested. As shown in Table 2.1, these will be collected/designated a frequency of 1 per 20 or fewer samples. The equation to be used to determine precision is presented in Section 5.3.1 of this QAPP. Laboratory precision acceptance criteria are presented in Table 2.3. Sample results will be qualified as specified in Section 5.0 if laboratory precision indicators do not meet the acceptance criteria.

2.8.2.3 Field Accuracy Criteria

The criteria for accuracy of the field sample collection procedures will be to ensure that samples are not affected by sources external to the sample, such as sample contamination by ambient conditions or sample cross-contamination. Field sampling accuracy will be assessed by the data from field blank samples for wipe samples, equipment blanks for bulk concrete samples and equipment rinse blanks for water samples.

Field blanks for wipe samples will consist of sampling media that is briefly exposed to ambient conditions but do not contact any surface. These will be collected at a frequency of 1 per 20 or fewer wipe samples or one field blank per day of sampling, whichever is less frequent.

Equipment blanks for bulk concrete samples will consist of collecting a wipe sample of the surface of the decontaminated core barrel bit. These will be collected to evaluate the equipment decontamination procedure at a frequency of 1 per 20 or fewer concrete cores advanced or one equipment blank per day of sampling, whichever is less frequent.

Equipment rinse blank samples for water samples will be collected at a frequency of 1 per 20 or fewer water samples to evaluate sampling equipment decontamination procedures only if sampling equipment requiring decontamination is used. These will be collected by routing laboratory-provided deionized water through decontaminated sampling equipment. Equipment blank samples will not be collected for samples collected using pre-cleaned or pre-cleaned, disposable sampling equipment.

Field blanks (wipes), equipment blanks and equipment rinse blank samples should not contain target analytes. The field and equipment blank sample data will be evaluated using the procedures specified in Section 5.3.2 of this QAPP. Accuracy also will be ensured by adhering to all sample handling procedures, sample preservation requirements and holding time periods.

2.8.2.4 Laboratory Accuracy Criteria

Laboratory accuracy will be assessed by determining percent recoveries from laboratory control sample (LCS) analyses. An LCS (LCS/LCSD for wipe samples) will be analyzed at a frequency of 1 per batch of 20 or fewer samples of the same matrix. Accuracy relative to the sample matrix will be assessed by determining percent recoveries from the analysis of matrix spike samples.

MS/MSD samples will be collected/designated for water and bulk concrete samples at a frequency of 1 per 20 or fewer samples. If insufficient bulk concrete sample is available for an MS/MSD to be analyzed, LCS/LCSD analysis will be requested. The equation to be used to determine accuracy for this project is presented in Section 5.3.2 of this QAPP. Laboratory accuracy acceptance criteria are presented in Table 2.3.

The accuracy of organic analyses also will be monitored through the analysis of surrogate compounds. Surrogate compounds are added to each sample, standard, blank and QC sample prior to sample preparation and analysis. Surrogate compounds are not expected to be found occurring naturally in the samples, but behave analytically similar to the compounds of interest. Consequently, surrogate compound percent recovery data will provide information on the effect that the sample matrix exhibits on the accuracy of the analyses. Surrogate compound percent recovery acceptance criteria are presented in Table 2.4.

2.8.2.5 Field Representativeness Criteria

Representativeness is dependent upon the proper design of the sampling program. The representativeness criteria for field sampling will be to ensure that samples are collected from the correct locations and that the proper sampling procedures are followed. The sampling program was designed to provide data representative of conditions at the Site.

2.8.2.6 Laboratory Representativeness Criteria

The representativeness criteria for laboratory data will be to ensure that the proper analytical procedures are used for sample preparation, sample analysis, and that sample holding times are met. Additionally, the accuracy and precision of the laboratory data affect representativeness. The laboratory representativeness criteria will include achieving the accuracy and precision criteria for the sample analyses.

2.8.2.7 Field Comparability Criteria

The comparability criteria for field data will be to ensure and document that the proper sampling procedures are followed and executed consistently.

2.8.2.8 Laboratory Comparability Criteria

The comparability criteria for laboratory data will be to ensure that the sample preparation, extraction and analysis methods used are comparable to the methods used for previous sampling events, as applicable. The methods identified in Section 3.3.2 of this QAPP are the same or comparable to the methods used to generate sample data previously at the Site.

2.8.2.9 Field Completeness Criteria

The criteria for field completeness will be that 90 percent or more of the samples planned to be collected are collected. The equation for calculating completeness is presented in Section 5.3.4 of this QAPP.

2.8.2.10 Laboratory Completeness Criteria

The criteria for laboratory completeness will be that 90 percent or more of the laboratory data are determined to be usable for the intended purpose. The procedure for determining laboratory data usability is provided in Section 3.9.2 of this QAPP. The equation for calculating completeness is presented in Section 5.3.4 of this QAPP.

2.8.2.11 Field Sensitivity Criteria

No field measurements that have sensitivity criteria are anticipated for this project.

2.8.2.12 Laboratory Sensitivity Criteria

The sensitivity criteria for the laboratory analyses will be the quantitation and method detection limits provided in Table 2.2. The methods selected for analyzing the samples are U.S. EPA methods routinely used to support environmental data gathering activities and are sufficiently sensitive to achieve the detectability requirements of the project.

It should be noted that high concentration of target and non-target analytes, sample moisture content, and matrix interferences may prevent the targeted quantitation limits from being achieved for all samples.

2.9 Special Training/Certification Requirements

The laboratory performing sample analysis is required to be accredited by the National Environmental Laboratory Accreditation Program (NELAP), which demonstrates compliance with ANSI/ASQC E4-94 ("Specifications and Guidelines for Quality System for Environmental Data Collection and Environmental Technology Programs", January 1995), and EPA QA/R-2 ("EPA Requirements for Quality Management Plans", March 2001). The laboratory being used for this project will accredited by NELAP for analyses to which accreditation applies.

2.10 Documentation and Records

The documents, records and reports generated during the project are identified in the following subsections.

2.10.1 Field and Laboratory Records

Documents and records generated during the project include sample collection records, QC sample records, field measurement records, sample chain of custody, laboratory records and data handling records. An overview of these documents and records is provided below. Detailed information regarding these records is provided in subsequent sections of this QAPP.

Sample collection records that will be generated during the sampling activities include field logbooks, chain-of-custody records and sample shipping documents.

QC sample records that will be generated during the project to document QC sample collection include field logbooks for recording field and equipment blank samples, field duplicate samples

and MS/MSD samples. The project laboratory will maintain quality records for water sent for equipment blank samples and will maintain sample integrity information. Records of sample preservation will be maintained in field logbooks and by the laboratory.

Field measurements will be recorded in bound logbooks or on standard field forms. Field instrument calibration data, where applicable, will also be recorded in these logbooks or on these forms.

Laboratory records that will be maintained for the project include sample receipt documentation, field and laboratory chain-of-custody documentation, sample container documentation, reagent and standard reference material certifications, sample preparation records, sample analysis records (e.g., run logs), instrument/raw data, QC data, calibration data, corrective action reports and final reports.

Data handling records that will be maintained include verification of computer programs used to manipulate or reduce raw data into final results and data validation reports. The laboratory will maintain documentation of data reduction, review, and verification procedures as necessary for the analyses conducted during the investigation. GHD will maintain checklists, notes and reports generated during the external data validation process.

2.10.2 Data Reporting Format

Field data will be recorded in bound logbooks or on standard forms. The details for recording field data are provided in Section 3.2.2.1 of this QAPP. Field data will be generated primarily from direct-reading meters or consist of field readings or observations. These data will be tabulated and included in project reports or submittals, as applicable.

Laboratory reports will consist of the following electronic and hard copy data deliverables.

1. Case Narrative
    a) date of issuance
    b) any deviations from intended analytical strategy
    c) laboratory lot or project number
    d) number of samples and respective matrices
    e) project name and number
    f) condition of samples "as received"
    g) discussion of whether or not sample holding times were met
    h) discussion of technical problems or other observations that may have created analytical difficulties

i) discussion of any laboratory quality control checks that failed to meet project criteria

j) signature of authorized laboratory signatory

2. Chemistry Data Package

a) dates of sample collection, receipt, preparation, and analysis

b) cross-reference of laboratory to project sample identification numbers

c) definitions of data qualifiers used

d) methods of sample preparation and analysis

e) sample results and sample-specific quantitation limits in tabular format

f) dilution factors and percent dry weight, as applicable

g) summaries of MS/MSD data, LCS and LCS/LCSD data, laboratory duplicate data, method blank data and surrogate compounds data

h) current control limits

i) copy of the fully executed chain-of-custody document

j) electronic data deliverable (EDD)

In addition to the data package containing items a through j, above, the laboratory will provide an expanded data deliverable package including instrument performance check data, initial calibration data, continuing calibration data, internal standards data, chromatograms, raw instrument data, sample preparation documentation, and instrument run logs in an appropriately bookmarked electronic format (i.e., portable document format or "pdf") for all of the submitted data packages.

Method detection limit studies and method performance and validation studies will be maintained by the laboratory and made available upon request.

2.10.3 Data Archiving and Retrieval

All records, including field and laboratory data, generated during the project will be maintained by GHD and TAL-Canton consistent with their record retention requirements.

3. Data Generation and Acquisition

The design and implementation of the measurement systems that will be used during the investigation, including sampling procedures, analytical procedures and data handling and documentation are detailed in the following subsections.

3.1 Sampling Process Design

The rationale for the sampling program and schedule for sampling and analytical activities and reviews are provided in the Work Plan. PCB mitigation within the warehouse will be performed in accordance with PCB Performance Based Disposal requirements described at 40 CFR 761.61(b).

Post-cleanup confirmation samples will be collected from dock levelers, concrete floor surfaces, metal/fiberglass walls, unpainted ceiling, trusses and non-encapsulated portions of support columns only. Confirmation sampling will not be conducted on surfaces such as painted walls and columns that are to be encapsulated as described in Section 5 of the Work Plan. Confirmation samples will consist of wipe samples collected in accordance with 40 CFR 761.123.

In addition, bulk concrete samples will be collected from seven locations where PCBs were detected previously in bulk concrete at concentrations greater than 1 mg/kg. These samples will be collected using a 2-inch diameter core barrel sampler advanced approximately 2 inches into the floor slab. The top of the core will be identified using arrows and the laboratory will cut the upper one-half inch off of the top of core. This portion of the core will be processed, extracted and analyzed for PCBs by the laboratory.

Section 5 of the Work Plan provides the details of the cleanup verification plan.

3.1.1 Sampling Methods

Sampling methods are provided in Attachment A.

3.1.2 Field Equipment and Sample Container Cleaning Procedures

All sample containers and sampling media will be provided by the laboratory. The containers will be pre-cleaned in accordance with the USEPA guidance document entitled "Specifications and Guidance for Contaminant-Free Sample Containers" (EPA 540/R-93/051), as applicable. Certificates of analysis for each lot of containers will be available from the container vendors.

3.1.3 Field Equipment Maintenance, Testing and Inspection Requirements

Field equipment will be inspected prior to being shipped to the field. Maintenance logs for all field equipment will be maintained, as applicable. Prior to use in the field, the equipment will be checked, generally during field calibration, and the information will be recorded in the field logbook. All equipment shipped back from the field will be inspected and tested upon return. Any required maintenance will be completed and documented prior to the equipment being returned to service. The GHD QA Officer is ultimately responsible for ensuring these functions have been performed.

Critical spare parts for field equipment and replacement field equipment are available from field equipment vendors as needed. The replacement equipment can be shipped for overnight delivery as necessary.

3.1.4 Inspection and Acceptance Requirements for Supplies and Sample Containers

The field supplies for the project consist of laboratory-grade detergent, distilled water for rinsing field equipment, water for equipment blank samples, wipe sampling media and containers to collect the samples.

Equipment blank water, wipe sampling media and sample containers will be provided by the laboratory. The laboratory will maintain or have access to its vendor's documentation of the purity/cleanliness of these materials. The laboratory's QA Officer is ultimately responsible for ensuring that these materials are acceptable for the project. The acceptability of these materials for use may be evaluated by reviewing lot analysis certificates, as applicable. Water, media and containers that do not meet the laboratory's acceptability requirements will not be shipped to the field.

3.2 Sample Handling and Custody Requirements

The procedures for sample handling, labeling, shipping and chain-of-custody documentation are provided in the subsections that follow.

3.2.1 Sample Handling

The procedures to be used to collect samples are provided in Attachment A. The number of containers, container volume, container type (material of construction), sample preservation, holding time periods, packaging and shipping requirements are identified in Table 3.1. Each sample will be assigned a unique sample identifier such that sample IDs are distinct both between locations and between sampling tasks.

Field blank, field duplicate and equipment rinse blank samples will be uniquely numbered to prevent laboratory bias of field QC samples. Samples designated for MS/MSD analysis will be identified as such in the remarks column of the chain-of-custody document.

All samples for chemical analysis will be placed in shipping coolers containing bagged, cubed ice immediately following collection. Samples will be shipped to the laboratory via an express courier service generally on the day they are collected. However, samples that are collected after the courier service has picked up the shipment for the day and samples collected on a Sunday or holiday will be shipped on the next business day.

To the extent practical, the laboratory will group samples in sample delivery groups (SDGs) by sample matrix. An SDG is a group of 20 or fewer field samples (including field QC samples) received by the laboratory.

3.2.2 Sample Custody

Chain of custody is the sequence of possession of an item. An item (such as a sample or final evidence file) is considered to be in a person's custody if the item is in actual possession of a person, the item is in the view of the person after being in his/her actual possession, or the item was in a person's physical possession but was placed in a secure area by that person. Field, laboratory and final evidence file custody procedures are described in the subsections that follow.

3.2.2.1 Field Custody Procedures

Logbooks will used to record field data collection activities. Entries into field logbooks will be described in as much detail as possible to ensure that a particular situation could be reconstructed solely from logbook entries. Field logbooks will be bound field survey books or notebooks. Each logbook will be identified by a project-specific document number.

The title page of each logbook will contain the following information.

- Person to whom the logbook is assigned
- Logbook number
- Project name
- Project start date
- End date

Entries into the logbook will contain a variety of information. At the beginning of each day's logbook entry, the date, start time, weather conditions and the names of all sampling team members present will be entered. The names of individuals visiting the Site or field sampling team and the purpose of their visit will also be recorded in the field logbook.

All field measurements obtained and samples collected will be recorded in the field logbook or on standard field forms. All entries will be in ink, signed, and dated with no erasures. If an incorrect entry is made, the incorrect information will be crossed out with a single strike mark that is initialed and dated by the person making the erroneous entry. The correct information will be entered into the logbook adjacent to the original entry.

Whenever a sample is collected or a measurement is made, a detailed description of the location will be recorded in the logbook. Photographs taken at a location, if any, will also be noted in the logbook. All equipment used to obtain field measurements will be recorded in the field logbook. In addition, the calibration data for all field measurement equipment will be recorded, as applicable.

The following packaging and shipping procedures will ensure that the chain of custody of samples collected for laboratory analysis remains intact.

1. The field sampler is personally responsible for the care and custody of the samples until they are transferred to another person or the laboratory. As few people as possible will handle the samples.

2. All sample containers will be identified by using sample labels that include the unique sample identification number and the date and time of collection. Sample labels will be completed for each sample using waterproof ink.

3. Samples will be accompanied by a properly completed chain-of-custody form. The sample identification numbers and required analyses will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving the samples will sign and record the date and time on the form. The chain-of-custody form documents sample custody transfers from the sampler to another person, to the laboratory or to/from a secure storage area.

4. Samples will be properly packaged for shipment (see Table 3.1) and dispatched to the laboratory for analysis with a separate signed chain of custody form enclosed in and secured to the inside top of each shipping cooler. Shipping coolers will be secured with packaging tape for shipment to the laboratory. Custody seals will be placed on the coolers and covered with clear plastic tape to prevent accidental damage to the seals.

5. If samples are split with a government agency or other entity, it is the responsibility of that entity to prepare its own chain-of-custody form for the samples. Information regarding the identity of the entity and the samples that are being split will be recorded in the field logbook.

6. All sample shipments will be accompanied by the chain of custody form identifying its contents. The chain-of-custody form is a four part carbonless copy form. The form is completed by the sampling team which, after signing and relinquishing custody to the shipper, retains the bottom (goldenrod) copy. The shipper, if different than the sampling team members, retains the pink copy after relinquishing custody to the laboratory. The yellow copy is retained by the laboratory and a copy of the fully-executed white (top) copy is returned as part of the data deliverables package.

7. If the samples are sent by common carrier, a bill of lading (e.g., FedEx airbill) will be used and copies will be retained. Commercial carriers are not required to sign the chain-of-custody form as long as the form is sealed inside the sample cooler and the custody seals remain intact.

GHD's QA Officer will be responsible for ensuring field documentation is complete.

3.2.2.2 Laboratory Custody Procedures

Laboratory sample custody begins when the samples are received at the laboratory. The field sample identification numbers, laboratory sample identification numbers, date and time of sample collection, date and time of sample receipt, and requested analyses will be entered into the sample receiving log.

Following log-in, all samples will be stored within an access-controlled location and will be maintained properly preserved (as defined in Table 3.1) until completion of all laboratory analyses. Unused sample aliquots and sample extracts will be maintained properly preserved for a minimum of 60 days following receipt of the final report. The laboratory will be responsible for the disposal of unused sample aliquots, sample containers and sample extracts in accordance with all applicable local, state and federal regulations.

The laboratory will be responsible for maintaining analytical logbooks and laboratory data. All laboratory records will be maintained consistent with the laboratory's record retention policy.

3.2.2.3 Final Evidence Files Custody Procedures

The final evidence file for the project will be maintained and will consist of the following:

1. Project plans
2. Project log books
3. Field data records
4. Sample identification documents
5. Chain-of-custody records
6. Correspondence
7. References, literature
8. Final data packages
9. Data validation memos/reports
10. Miscellaneous - photos, maps, drawings
11. Final reports

3.3 Analytical Method Requirements

The field and laboratory analytical methods that will be used during the investigation are detailed in the following subsections.

3.3.1 Field Analytical Methods

No field analytical methods are anticipated to the used during the project.

3.3.2 Laboratory Analytical Methods

The laboratory will use standard operating procedures based on the reference methods presented in Table 3.2. The quantities and types of QC samples for the project are presented in Table 2.1.

3.4 Quality Control Requirements

The field and laboratory QC requirements for the investigation are discussed in the following subsections.

3.4.1 Field Sampling Quality Control

Field QC samples for this project include field blanks for wipe samples, equipment blanks for bulk concrete sampling and equipment rinse blanks for water samples to check procedural contamination and/or ambient conditions and/or sample container contamination at the Site that may cause sample contamination. In addition, field duplicate samples will be collected, as appropriate, to assess the overall precision of the sampling and analysis event. The frequency of collection for these field QC samples was provided in Section 2.8 of this QAPP. The evaluation of field QC data is provided in Section 3.9.2 of this QAPP.

3.4.2 Analytical Quality Control

The laboratory QC requirements for the analyses include, but are not limited to, analyzing method blanks, initial calibration standards, calibration verification standards, internal standards, surrogate compound spikes, MS/MSD samples and LCSs. The acceptance criteria for MS/MSD, LCSs and surrogate compounds are provided in this QAPP. The analysis frequency and acceptance criteria for the remaining QC checks will be consistent with the methods in Table 3.2 and with the laboratory SOPs in Attachment B.

3.5 Instrument/Equipment Testing, Inspection and Maintenance Requirements

The procedures used to verify that instruments and equipment are functional and properly maintained are described in the following subsections.

3.5.1 Field Instrument Maintenance

Specific preventive maintenance procedures to be followed for field equipment are those recommended by the manufacturer, and will meet or exceed the manufacturers' recommendations.

3.5.2 Laboratory Instrument Maintenance

As part of its QA program, the laboratory will conduct routine preventive maintenance to minimize the occurrence of instrument failure and other system malfunctions. Designated laboratory employees will regularly perform routine scheduled maintenance and repair of (or coordinate the repair of) all instruments. All maintenance that is performed is documented. All laboratory instruments are maintained in accordance with manufacturer's specifications. Table 3.3 provides examples of the frequency at which components of key analytical instruments or equipment will be serviced.

3.6 Calibration Procedures and Frequency

The procedures for maintaining the accuracy for all the instruments and measuring equipment that are used for conducting field and laboratory analyses are described in the following subsections. These instruments and equipment will be calibrated prior to each use or according to a periodic schedule.

3.6.1 Field Instruments/Equipment

Equipment to be used during field sampling will be examined to confirm that it is in operating condition. This includes checking the manufacturer's operating manual to ensure that all maintenance requirements are being observed. Individual calibration records will be reviewed to ensure that any prior equipment problems have not been overlooked and all necessary repairs to equipment have been completed. Field instrument calibration will be performed in accordance with manufacturer's specifications.

3.6.2 Laboratory Instruments

Calibration of laboratory equipment will be based on approved written procedures. Records of calibration, repairs or replacement will be filed and maintained by the designated laboratory personnel performing these quality control activities. These records generally will be filed at the location where the work is performed and will be subject to a QA audit. The laboratory will have trained staff and in-house spare parts available for instrument repair or will maintain service contracts with vendors. Specific calibration procedures and frequencies are detailed in the laboratory SOPs.

3.7 Inspection/Acceptance Criteria for Supplies and Consumables

The procedures that will be used to ensure that supplies and consumables used in the field and laboratory will be available as needed and free of contaminants are detailed in the following subsections.

3.7.1 Field Supplies and Consumables

Supplies and consumables for field measurements and sampling will be obtained from various vendors and will include sample containers, laboratory detergent, distilled water, wipe sampling media and laboratory-supplied equipment blank water. Additional field supplies and consumables include disposable sampling supplies and personnel protective equipment. All field supplies will be consumed or replaced with sufficient frequency to prevent deterioration or degradation that may interfere with the analyses.

3.7.2 Laboratory Supplies and Consumables

Vendors for general labware and reagents used by the laboratory may include VWR Scientific Products and Fisher Scientific. Vendors for chromatography supplies and organic standards may include Ultra Scientific, Supelco, Accustandard, Restek, ChemService, Cambridge Isotopes and

Aldrich Chemical. The lot numbers of reagents and standards will be recorded and dates of receipt, first use and expiration will be documented by the laboratory. Certificates of analysis will be maintained on file to document reagent/standard purity.

The SOPs provide details on identifying contaminants in reagents and standards, determining deterioration of reagents and standards, and the corrective actions required if contaminants or deterioration are identified. The laboratory's QA Officer is ultimately responsible for the ensuring the acceptability of supplies and consumables.

3.8 Data Acquisition Requirements (Non-Direct Measurements)

Historical data from previous monitoring events are discussed in the Work Plan. Although most historical data were generated using standard EPA methods by accredited laboratories, the use of historical data for the building decontamination activities, beyond that discussed in Work Plan Section 5.2.2, is not anticipated.

3.9 Data Management

The procedures for managing data from generation to final use and storage are detailed in subsections that follow.

3.9.1 Data Recording

Field data will be recorded in field logbooks and consist of measurements from direct-reading instruments or direct measurements, as appropriate. Field staff are responsible for recording field data, and the GHD QA Officer or designee is responsible for identifying and correcting any recording errors.

Laboratory data are recorded in a variety of formats. Data from instruments are recorded on magnetic media, strip charts or bench sheets. The SOPs provide the data recording requirement for each preparation and analysis method.

3.9.2 Data Validation

Validation of field data for this project will primarily consist of checking all data for transcription errors and reviewing information recorded in field logbooks. Data transcribed from the field logbook into summary tables for reporting purposes will be verified for correctness by the GHD's QA Officer or designee.

The Laboratory QA Officer or designee will be responsible for verifying that laboratory procedures for data acquisition, review, reporting and archiving documented in the laboratory SOPs were followed. Laboratory personnel will make a systematic effort to identify any QC non-conformances and errors before they report the data. Errors found during data verification will be identified and corrected; QC non-conformances that cannot be attributed to errors in analysis, transcription or calculation will be clearly identified in the case narrative section of the analytical data package.

Validation of the environmental analytical data will be performed under direction of the GHD QA Officer using the QC deliverables specified in Section 2.10.2 of this QAPP.

Should data not meeting the measurement performance criteria described Section 2.8.2 or method requirements be found during data validation, the GHD chemistry staff will apply data qualifiers following the guidance in *National Functional Guidelines for Superfund Organic Methods Data Review,* (EPA-540-R-014-002, October 2013). Should the referenced data validation guidance not provide direction for qualifying data in a specific situation encountered, the results may be qualified based on professional judgment.

Results of the data validation will be included in project reports.

3.9.3 Data Reduction

Field data reduction procedures will be minimal in scope compared to those implemented for laboratory data. These data will be recorded in field logbooks or on standard forms immediately after the measurements are obtained.

Laboratory data reduction consists of producing the final results from raw data. The procedures, calculations and specific equations used by the laboratory for data reduction are detailed in the SOPs.

3.9.4 Data Transmittal/Transfer

Field measurements will be entered into a standard spreadsheet format, as necessary. GHD's QA Officer or designee is responsible for verifying the correctness of the field data after the data are transferred to spreadsheet format.

The project laboratory will provide data in electronic format as electronic data deliverables (EDDs) that are compatible with the project database for chemistry and geographical data. The laboratory's QA Officer is responsible for verifying accurate transfer of data from the analytical instruments to the LIMS. EDDs are generated directly from the LIMS, thereby eliminating the possibility of manual transcription errors.

GHD's QA Officer or designee will be responsible for verifying the correctness of the analytical database after the laboratory data have been imported. This is accomplished by comparing the data from the database to the hardcopy analytical reports for a minimum of 10 percent of the sample results. If discrepancies between the database and hardcopy analytical reports are identified, a complete verification of the database will be performed or a new EDD will be submitted, imported and verified as described previously. GHD's QA Officer or designee will also be responsible for incorporating any data qualifiers resulting from data validation into the analytical database and verifying the accuracy of the updated results.

3.9.5 Data Analysis

Laboratory data will be evaluated as described in the Work Plan. It is anticipated that commercially-available software may be used to facilitate the evaluation/visualization of the data.

The actual software used and input parameters/assumptions will be identified in project reports, as necessary. There are no extreme or unique computer hardware required to use this software.

3.9.6 Data Assessment

Assessment of laboratory data by the laboratory will be performed using the procedures detailed in the SOPs. These assessments include determining the mean, standard deviation, percent relative standard deviation (RSD), percent difference, RPD and percent recovery for certain QC elements.

Assessment of QC data for data validation purposes will include determining percent recovery, RPD and percent completeness. The statistical equations to determine percent recovery, RPD and percent completeness are provided in Section 5.3 of this QAPP.

3.9.7 Data Tracking

Data generated in the field will be recorded in field logbooks or on standard field forms. There are no unique or special tracking requirements for these data. The data will be transcribed for analysis and reporting as discussed in Section 3.9.4 of this QAPP, and the original field logbooks and field forms will be maintained in the final evidence file.

Laboratory data tracking procedures will be consistent with the laboratory's standard procedures for tracking data from generation to reporting. The laboratory's LIMS will also provide a means for tracking data in the laboratory. The laboratory's Operations Manager is ultimately responsible for data tracking in the laboratory.

Tracking analytical data in the database includes recording the laboratory generating the data, the dates when the EDDs were received and imported, the date when qualifiers were applied to the results, and the level of data validation performed. GHD's Project Manager is ultimately responsible for tracking data from entry into the database to reporting.

4. Assessment/Oversight

The following subsections describe the procedures used to ensure proper implementation of this QAPP and the activities for assessing the effectiveness of the implementation of the project and associated QA/QC activities.

4.1 Assessments and Response Actions

Assessments consisting of internal and external audits may be performed during the project. Internal technical system audits of both field and laboratory procedures, if conducted, will verify that sampling and analysis are being performed in accordance with the procedures established in the SAPs and this QAPP. External audits may be conducted by the regulatory agencies, as discussed below.

An internal field technical system audit of field activities, including sampling and field measurements, may be conducted by the QA Officer or designee at the beginning of the field sampling activities to identify deficiencies in the field sampling and documentation procedures. The field technical system audit, if conducted, will include examining field sampling records, field instrument operating records, field instrument calibration records and chain-of-custody documentation. In addition, sample collection, handling and packaging in compliance with the established procedures will be reviewed during the field audit. Any deficiencies identified will be documented and corrective actions will be taken to rectify the deficiencies.

Corrective action resulting from internal field technical system audits will be implemented immediately if data may be adversely affected from the use of unapproved or improper use of approved methods. GHD's QA Officer will identify deficiencies and recommended corrective action to the GHD Project Manager. Implementation of corrective actions will be performed by the GHD's QA Officer and field team. Corrective action will be documented in the field logbook and/or the project file. Follow-up audits will be performed as necessary to verify that deficiencies have been corrected, and that the QA/QC procedures described in this QAPP and the Work Plan are maintained throughout the project.

An external field technical system audit may be conducted by EPA and/or IDEM at any time during the field operations. These audits may or may not be announced.

An internal laboratory technical system audit may be conducted during the project by the laboratory QA Officer or designee. The laboratory technical system audit generally is conducted on an annual basis and includes examining laboratory documentation regarding sample receiving, sample log-in, storage and tracking, chain-of-custody procedures, sample preparation and analysis, instrument operating records, data handling and management, data tracking and control and data reduction and verification. The laboratory QA Officer will evaluate the results of the audit and provide a final report to section managers and the Operations Manager that includes any deficiencies and/or noteworthy observations.

Corrective action resulting from deficiencies identified during internal laboratory technical system audits will be implemented immediately. The Operations Manager or section leaders, in

consultation with the laboratory supervisor and staff, will approve the required corrective action to be implemented by the laboratory staff. The laboratory QA Officer will ensure implementation and documentation of the corrective action. All problems requiring corrective action and the corrective action taken will be reported to the laboratory Project Manager. Follow-up audits will be performed as necessary to verify that deficiencies have been corrected.

An external laboratory audit may be conducted at the discretion of EPA or IDEM. These audits may or may not be announced. External laboratory audits, if conducted, may include, but not be limited to, reviewing laboratory analytical procedures, laboratory on-site audits, and/or submitting performance evaluation samples to the laboratory for analysis.

4.2 Reports to Management

Quality Assurance Management Reports will be prepared for the project. Minimally, these reports will include the results of periodic data quality validation and assessment; data use limitations, and any significant QA problems identified and corrective actions taken.

GHD's QA Officer will be responsible within the organizational structure for preparing these reports. GHD's Project Manager will be provided with these reports.

5. Data Verification/Validation and Usability

The QA activities that will be performed to ensure that the project data are scientifically defensible, properly documented, of known quality, and meet the project objectives are described in the following sections.

5.1 Data Review, Verification and Validation Requirements

All field and laboratory data will be reviewed, verified and validated. These terms are defined as follows:

- Data review is the in-house examination to ensure that 100% of the data have been recorded, transmitted and processed correctly.
- Data verification is the process for evaluating the completeness, correctness and conformance/compliance of 100% of a specific data set against the method, procedural, or contractual specifications.
- Data validation is an analyte- and sample-specific process that extends the evaluation of data beyond method, procedure or contractual compliance (i.e., data verification) to project specific data quality objectives. The purpose of data validation is to assess the performance associated with the sampling and analysis to determine the quality of 100% of a specific data set relative to the end use.

The procedures and criteria used to verify and validate field and laboratory data are presented in Sections 3.9.2 and 5.2 of this QAPP. Field data and logbooks will be reviewed to ensure that the requirements of the sampling program, including the number of samples and locations, sampling, and sample handling procedures, were fulfilled.

Laboratory data review consists of raw data being reduced to results and checked by the responsible analyst. A second review of the data reduction procedure is conducted by another analyst or senior chemist. After the data are verified (see Section 5.2), a draft report is reviewed by the laboratory Project Manager. Final reports are generated, signed and transmitted after approval of the draft by the Project Manager.

5.2 Verification and Validation Methods

Field data will be verified by reviewing field documentation and chain-of-custody records. Data from direct-reading field instruments will be verified by reviewing calibration and operating records and the QC data specified in Section 2.8.2 of this QAPP.

Verification of sample collection procedures consists of reviewing sample collection documentation for compliance with the requirements of this QAPP and the field sampling procedures provided in the SOPs. If alternate sampling procedures were used, the acceptability of the procedure will be evaluated to determine the effect on the usability of the data. Data usability will not be affected if the procedure used is determined to be an acceptable alternative that fulfills the measurement performance criteria in Section 2.8.2 of this QAPP.

The laboratory will internally verify its data by reviewing and documenting sample receipt, sample preparation, sample analysis (including internal QC checks), and data reduction and reporting. Any deviations from the acceptance criteria, corrective actions taken, and data determined to be of limited usability (i.e., laboratory-qualified data) will be noted in the laboratory reports.

Verification of laboratory data will consist of reviewing the final reports to ensure that the methods used to analyze the samples were consistent with the requirements of this QAPP. Sample handling records will also be reviewed to ensure that sample integrity remained intact from collection to laboratory receipt, that samples were received by the laboratory in a timely fashion, and that samples were properly preserved. Chain-of-custody documentation and sample condition upon laboratory receipt will be reviewed. Laboratory results, holding time periods and QC data will be reviewed to determine compliance with the measurement performance criteria in Section 2.8.2 of this QAPP and the analytical methods.

Data validation will be conducted consistent with the procedure identified in Section 3.9.2 of this QAPP. The results of the data verification procedure will identify data that do not meet the measurement performance criteria in Section 2.8.2 of this QAPP. Data validation will determine whether the data are acceptable, of limited usability (qualified as estimated), or rejected. Data qualified as estimated will be reviewed and a discussion of the usability of estimated data will be included in the data validation memoranda. The results of data verification/validation will be summarized in data validation memoranda provided to GHD's Project Manager for use in interpreting the results and for use in project reports.

Data determined to be unusable may require corrective action to be taken. Potential types of corrective action may include resampling by the field team or reanalysis of samples by the laboratory. The corrective actions taken are dependent upon the ability to mobilize the field team and whether or not the data are critical for project DQOs to be achieved. GHD's Project Manager will be responsible for approving the implementation of any corrective action deemed to be necessary during data verification/validation.

5.3 Usability/Reconciliation with Data Quality Objectives

The overall usability of the data for the investigation will be assessed by evaluating the PARCCS of the data set to the measurement performance criteria in Section 2.8.2 of this QAPP using basic statistical quantities, as applicable. The procedures and statistical formulas to be used for these evaluations are presented in the following subsections.

5.3.1 Precision

Precision of field sample collection will be evaluated by assessing the RPD data from field duplicate samples. Analytical precision will be evaluated by assessing the RPD data from duplicate spiked sample analyses, laboratory duplicate samples (for certain inorganic analyses), or duplicate LCS sample analyses. The RPD between two measurements is calculated using the following formula.

$$RPD = \frac{|R_1 - R_2|}{} \times 100$$

$$\left[\frac{(R_1 + R_2)}{2}\right]$$

where:

R_1 = value of first result
R_2 = value of second result

RPD data will provide the means to evaluate the overall variability attributable to the sampling procedure, sample matrix, and laboratory procedures. It should be noted that the RPD of two measurements can be very high when the concentrations approach the quantitation limit of an analysis. RPDs will only be calculated when the concentrations of an analyte detected in both samples are greater than or equal to 5 times the quantitation limit for the analyte.

5.3.2 Accuracy/Bias

The data from method blank samples, field blank samples (wipes), equipment blank samples, equipment rinse blank samples, MS/MSD samples, surrogate compound spikes and LCSs will be used to determine accuracy and potential bias of the sample data.

The data from method blank samples provide an indication of laboratory contamination that may result in bias of sample data. Sample data associated with method blank contamination will have been identified during the data verification/validation process. Sample data associated with method blank contamination are evaluated during the data validation procedure to determine if analytes detected in samples associated with contaminated method blanks are "real" or are the result of laboratory contamination. The procedure for this evaluation involves comparing the concentration of the analyte in the sample to the concentration in the method blank sample taking into account adjustments for sample preparation and dilution factors. In general, the sample data are qualified as not detected if the sample concentration is less than 5 times (10 times for common laboratory contaminants) the method blank concentration. The result and quantitation limit for the affected analyte will be modified as specified by *National Functional Guidelines for Superfund Organic Methods Data Review,* (EPA-540-R-014-002, October 2013). Specifically, if the affected sample result is less than the quantitation limit, the quantitation limit will be reported. If the affected sample result is greater than the quantitation limit, the quantitation limit will be elevated to the concentration detected in the sample.

The data from field blank, equipment blank and equipment rinse blank samples provide an indication of field conditions that may result in bias of sample data. Sample data associated with contaminated field blank, equipment blank and equipment rinse blank samples will have been identified during the data verification/validation process. The evaluation procedure and qualification of sample data associated with field blank, equipment blank and equipment rinse blank contamination is performed in a similar manner as the evaluation procedure for method blank sample contamination.

Matrix spike sample data provide information regarding the accuracy/bias of the analytical methods relative to the sample matrix. Matrix spike samples are field samples that have been fortified with target analytes prior to sample preparation and analysis. The percent recovery data provide an indication of the effect that the sample matrix may have on the preparation and

analysis procedure. Sample data exhibiting matrix effects will have been identified during the data verification/validation process.

Surrogate spike recoveries provide information regarding the accuracy/bias of organic analyses on an individual sample basis. Surrogate compounds are not expected to be found in the samples and are added to every sample prior to sample preparation. The percent recovery data provide an indication of the effect that the sample matrix may have on the preparation and analysis procedure. Sample data exhibiting matrix effects will have been identified during the data verification/validation process.

Analytical accuracy/bias will be determined by evaluating the percent recovery data of LCSs. LCSs are artificial samples prepared in the laboratory using a blank matrix fortified with analytes from a standard reference material that is independent of the calibration standards. LCSs are prepared and analyzed in the same manner as the field samples. The percent recovery data from LCS analyses will provide an indication of the accuracy and bias of the analytical method for each analyte or analyte group.

Percent recovery is calculated using the following formula:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

SSR = Spiked Sample Result

SR = Sample Result or Background

SA = Spike Added

The percent recovery for surrogate compounds and LCSs are determined by dividing the measured value by the true value and multiplying by 100.

Accuracy/bias will be determined by comparing the percent recovery data to the measurement performance criteria in Section 2.8.2 of this QAPP.

5.3.3 Sample Representativeness

Representativeness of the samples will be assessed by reviewing sample holding times, the results of field audits, if conducted, and the data from field duplicate samples. Sample representativeness will be considered acceptable if holding time periods are met, the results of field audits indicate that the approved sampling methods or alternate acceptable sampling methods were used to collect the samples and that sample recovery was adequate, and the field duplicate RPD data are acceptable.

5.3.4 Completeness

Completeness will be assessed by comparing the number of valid (usable) sample results to the total possible number of results within a specific sample matrix and/or analysis. Percent completeness will be calculated using the following formula:

$$\% \text{ Completeness} = \frac{\text{Number of Valid (usable) measurements}}{\text{Number of Measurements Planned}} \times 100$$

Completeness will be considered acceptable if 90 percent of the data are determined to be valid after performance of the data validation procedures. Data qualified as estimated will be deemed usable.

5.3.5 Comparability

The comparability of data sets will be evaluated by reviewing the sampling and analysis methods used to generate the data for each data set. Comparability will be determined to be acceptable if the sampling and analysis methods specified in this QAPP and any approved QAPP revisions or amendments are used for generating the data.

Comparability of data from split samples (samples that are collected at the same time from the same location and split equally between two parties using sample containers from the same source or vendor), if collected, will be evaluated by determining the RPD of detected analytes in both samples following data verification/validation. Analytes that are detected in only one of the two samples will be assessed by reviewing the data validation reports for both data sets and determining the cause of the discrepancy, if possible. Comparability of split sample data will be considered acceptable if the RPD for detected analytes with concentrations greater than or equal to 5 times their respective quantitation limits does not exceed RPD acceptance criteria for field duplicate samples.

5.3.6 Sensitivity and Quantitation Limits

Method quantitation limits will be reviewed to ensure that the sensitivity of the analyses was sufficient to achieve the detectability requirements. All relevant QC data will be reviewed to assess compliance with the measurement performance criteria specified in Section 2.8.2 of this QAPP. Sensitivity will be considered acceptable if quantitation limits for the samples are sufficient to achieve the detectability requirements for the investigation.

It should be noted that quantitation limits may be elevated as a result of high concentrations of target compounds, non-target compounds and matrix interferences (collectively known as sample matrix effects). In these cases, the sensitivity of the analyses will be evaluated on an individual sample basis relative to the applicable evaluation criteria. The need to investigate the use of sample cleanup techniques or alternate analytical methods may be required if the sensitivity of the analytical methods identified in this QAPP cannot achieve the evaluation criteria as a result of sample matrix effects.

5.3.7 Data Limitations and Actions

Data use limitations will be identified in data validation reports. Data that do not meet the measurement performance criteria specified in this QAPP will be identified and the impact on the project quality objectives will be assessed and discussed in data validation and project reports.

Field information will be reviewed to ensure that all sampling procedures and field measurements were conducted in accordance with the requirements of this QAPP. The data from field

measurements obtained or samples collected using procedures inconsistent with the requirements of this QAPP will be evaluated using the procedures in Section 5.1 of this QAPP. Specific actions for field or laboratory data that do not meet the measurement performance criteria depend on the use of the data, and may require that additional samples are collected or the use of the data be restricted.

6.0 References

IDEM. 2015. *Quality Assurance Project Plan - Guidance*. IDEM Office of Land Quality.

U.S. EPA. 2001. *EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5.* EPA/240/B-01/003.

U.S. EPA. 2002. *Guidance for Quality Assurance Project Plans, EPA QA/G-5*. EPA/240/R-02/009.

U.S. EPA. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4*. EPA/240/B-06/001.

U.S. EPA. 2013. *National Functional Guidelines for Superfund Organic Methods Data Review, **EPA-540-R-014-002.***

Figures

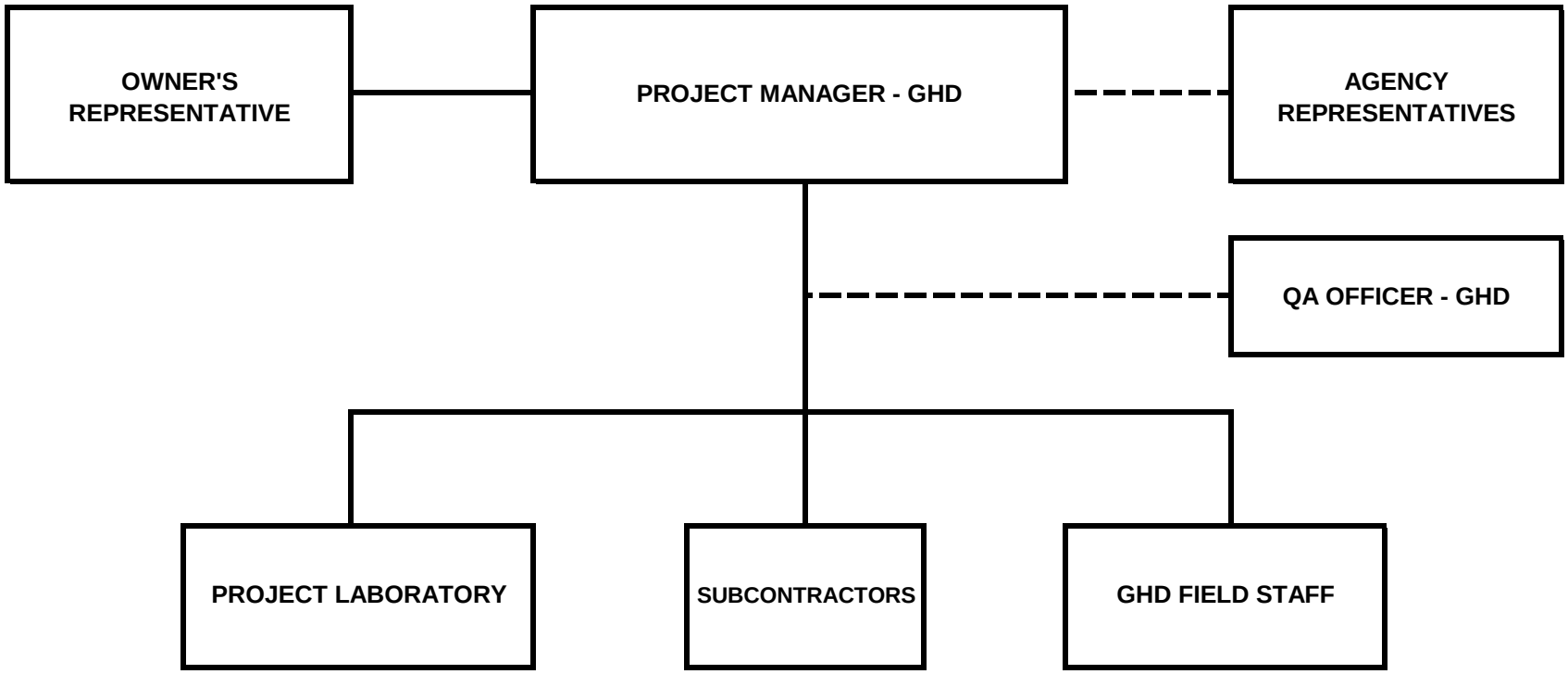

figure 2.1

PROJECT QA ORGANIZATION
BUILDING PCB DECONTAMINATION WORK PLAN
Indianapolis Return Center
Indianapolis, Indiana

Tables

Table 2.1

Summary of Anticipated Sampling and Analysis Program
Indianapolis Return Center
Indianapolis, Indiana

Task/Sampling Program	Sample Matrix	Laboratory Analyses[1]	Investigative Samples[2]	Quality Control Samples: Equipment Blanks/ Media Blanks[3]	Quality Control Samples: Field Duplicates[4]	Quality Control Samples: MS/MSD[5]	Total[6]
Post-Cleaning Concrete Confirmation Sampling							
Surface Wipe Sampling	Surface Residue	PCBs (as Aroclors)	TBD	1 per 20 or fewer	1 per 20 or fewer	1 per 20 or fewer	TBD
Concrete Core Sampling	Bulk Concrete	PCBs (as Aroclors)	7	1	0	1	10
Post-Cleaning Wash Water Sampling							
Treated Water Sampling	Treated Wash Water for Re-Use	PCBs (as Aroclors)	TBD	1 per 20 or fewer	1 per 20 or fewer	1 per 20 or fewer	TBD
Spent Water Sampling	Spent Wash/Rinse Water for Disposal	PCBs (as Aroclors)	TBD	1 per 20 or fewer	1 per 20 or fewer	1 per 20 or fewer	TBD

Notes:

1 PCBs (as Aroclors) - Polychlorinated Biphenyls reported as Aroclors.

2 TBD - To be determined based on the sample collection program described in Section 3.1 of this QAPP.

3 Field blanks collected for the wipe sampling program will consist of blank wipe media. Equipment blanks collected for the concrete core sampling program will consist of collecting a wipe sample of the coring bit. Equipment rinse blank samples will be collected for the water sampling programs unless pre-cleaned, disposable sampling equipment is used.

4 Field duplicate samples are not applicable to the concrete core sampling program.

5 Matrix spike/matrix spike duplicate (MS/MSD) analyses will be conducted for the water and bulk concrete sampling programs only. Samples designated for MS/MSD analyses will be collected at a frequency of one per 20 or fewer investigative samples. MS/MSD samples for water matrices require triple the normal sample volume to be submitted. The laboratory will analyze duplicate laboratory control samples (LCS/LCSD) for surface wipe samples.

6 Total number of samples to be collected will be based on the sample collection programs and QC samples collected.

Table 2.2

Target Analytes and Quantitation Limits
Indianapolis Return Center
Indianapolis, Indiana

Analysis	CAS No.	Targeted Quantitation Limit[1]	Units
Polychlorinated Biphenyls - Surface Wipes			
Aroclor 1016	12674-11-2	2.0	µg
Aroclor 1221	11104-28-2	2.0	µg
Aroclor 1232	11141-16-5	2.0	µg
Aroclor 1242	53469-21-9	2.0	µg
Aroclor 1248	12672-29-6	2.0	µg
Aroclor 1254	11097-69-1	2.0	µg
Aroclor 1260	11096-82-5	2.0	µg
Polychlorinated Biphenyls - Bulk Concrete			
Aroclor 1016	12674-11-2	200	µg/kg
Aroclor 1221	11104-28-2	200	µg/kg
Aroclor 1232	11141-16-5	200	µg/kg
Aroclor 1242	53469-21-9	200	µg/kg
Aroclor 1248	12672-29-6	200	µg/kg
Aroclor 1254	11097-69-1	200	µg/kg
Aroclor 1260	11096-82-5	200	µg/kg
Polychlorinated Biphenyls - Water			
Aroclor 1016	12674-11-2	0.50	µg/L
Aroclor 1221	11104-28-2	0.50	µg/L
Aroclor 1232	11141-16-5	0.50	µg/L
Aroclor 1242	53469-21-9	0.50	µg/L
Aroclor 1248	12672-29-6	0.50	µg/L
Aroclor 1254	11097-69-1	0.50	µg/L
Aroclor 1260	11096-82-5	0.50	µg/L

Note:

[1] The targeted quantitation limit for wipes is based on a 100 cm^2 surface area being wiped. The limits and results provided by the laboratory for wipes will be in units of micrograms (µg). The limits and results for bulk concrete samples will be reported on a dry-weight basis and the actual limits will be higher than shown. Targeted quamtitation limits are provided for guidance and may not be achievable for all samples as a result of matrix interferences or high concentrations of target and/or non-target compounds.

Table 2.3

Percent Recovery and Relative Percent Difference Control Limits
Indianapolis Return Center
Indianapolis, Indiana

Analysis	CAS No.	% Recovery Control Limits[1]	
Polychlorinated Biphenyls - Surface Wipes		***LCS/LCSD***	***MS/MSD***
Aroclor 1016	12674-11-2	35-134 (30)	NA[2]
Aroclor 1260	11096-82-5	40-133 (30)	NA
Polychlorinated Biphenyls - Bulk Concrete			
Aroclor 1016	12674-11-2	51-120	17-141 (56)
Aroclor 1260	11096-82-5	48-120	19-137 (55)
Polychlorinated Biphenyls - Water			
Aroclor 1016	12674-11-2	48-126	40-129 (40)
Aroclor 1260	11096-82-5	43-130	10-126 (52)

Notes:

[1] Values in parentheses are the maximum RPD values allowed for LCS/LCSD or MS/MSD analytes. Laboratory control limits are updated on a periodic basis and the control limits in effect when the samples are analyzed will be used for data validation purposes.

[2] NA - Not Applicable

Table 2.4

Surrogate Compound Percent Recovery Control Limits
Indianapolis Return Center
Indianapolis, Indiana

Analysis	Surrogate Compound	CAS No.	% Recovery Control Limits[1]		
			Wipes	Bulk Concrete	Water
PCBs	Decachlorobiphenyl	877-09-8	29-139	13-134	21-124
	Tetrachloro-m-xylene	2051-24-3	33-141	10-155	10-131

Note:

[1] Laboratory control limits are updated on a periodic basis and the control limits in effect when the samples are analyzed will be used for data validation purposes.

Table 3.1

Sample Container, Preservation, Holding Time, Volume, Shipping and Packaging Requirement
Indianapolis Return Center
Indianapolis, Indiana

Matrix/Analyses	Sample Containers	Preservation[1]	Maximum Holding Time from Sample Collection[2]	Volume of Sample	Shipping	Packaging
Surface Wipes						
PCBs	One 60-mL glass jar containing a hexane-saturated gauze pad	Iced	One year for completion of analysis 40 days after extraction for analysis	10 cm by 10 cm area wiped per gauze pad	Overnight Courier	Bubble Wrap
Bulk Concrete						
PCBs	None[3]	Iced	One year for completion of analysis 40 days after extraction for analysis	2" diameter by 2" deep cylindrical core	Overnight Courier	Bubble Wrap
Water						
PCBs	Two 1-L amber glass bottles per sample	Iced	One year for completion of analysis 40 days after extraction for analysis	Fill to neck of bottle	Overnight Courier	Bubble Wrap

Notes:

[1] Samples requiring refrigeration will be shipped in coolers containing bagged, cubed ice. Following laboratory receipt and log-in, these samples will be stored by the laboratory at 0° to 6°C.

[2] Maximum holding times presented are technical holding times and are based on the time elapsed from sample collection.

[3] Concrete cores will be marked showing the original orientation and will be wrapped in aluminum foil after collection. The foil-wrapped sample will be placed inside of a bubble wrapper or zipper-lock bag for transport.

Table 3.2

Summary of Analytical Methods
Indianapolis Return Center
Indianapolis, Indiana

Matrix/Parameter[1]	Preparation Method[2]	Analysis Method[2]
Surface Wipes		
PCBs (as Aroclors)	SOP[3] for SW-846 3540C	SOP for SW-846 8082
Bulk Concrete		
PCBs (as Aroclors)	SOP for SW-846 3540C	SOP for SW-846 8082
Water		
PCBs (as Aroclors)	SOP for SW-846 3520C	SOP for SW-846 8082

Notes:

[1] PCBs - Polychlorinated Biphenyls

[2] SW-846 - "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", EPA SW-846, 3rd Edition with Updates I through IIIB.

[3] SOP - Standard Operating Procedure

Table 3.3

Routine Preventive Maintenance Procedures and Schedules
Indianapolis Return Center
Indianapolis, Indiana

Instrument	Maintenance Procedures/Schedule	Spare Parts in Stock
Gas Chromatograph/Electron Capture Detector	1. Change septa weekly or as often as needed. 2. Change gas line dryers as needed. 3. Replace GC injector glass liner weekly or as often as needed. 4. Replace GC column as needed. 5. Clean/replace GC detector as needed. 6. Check to ensure that gas supply is sufficient for the day's activity and the delivery pressures are set as described in the SOP. 7. Check to ensure the pressure on the primary regulator never falls below 100 psi.	1. Syringes 2. Septa 3. Detectors 4. Glass liners 5. GC columns

Attachments

Attachment A
Field Sampling
Standard Operating Procedures

Attachment A

Field Sampling Standard Operating Procedures

1. Wipe Sampling Procedure

1.1 General

Standard wipe tests, as defined at 40 CFR 761.123, will be conducted to verify whether or not the numeric surface cleanup standards have been met. Wipe sampling will be conducted in general accordance with the U.S. EPA guidance document "Wipe Sampling and Double Wash/Rinse Cleanup as Recommended by the Environmental Protection Agency PCB Spill Cleanup Policy", dated June 23, 1987 and as revised and clarified on April 18, 1991. The procedure to be used for wipe sampling is provided below.

1.2 Sampling Equipment

Wipe sampling kits are provided by the project laboratory. These kits consist of one n-hexane saturated gauze pad contained within a 60-mL glass jar with a polytetrafluoroethylene (PTFE or Teflon®) lined lid for each sample being collected. One clean, single-use, standard-sized template (10 centimeters [cm] x 10 cm) per sample is also provided to delineate the area to be sampled.

Additional equipment/supplies required include:

- Clean, disposable nitrile gloves
- Sample cooler(s)
- Bagged, cubed ice
- Sample labels
- Field logbook
- Sample collection/chain-of-custody forms

1.3 Equipment Decontamination

No equipment requiring decontamination will be used to collect surface wipe samples.

1.4 Field Procedure for Wipe Sampling

1. Determine the exact location where the sample will be collected and place the template on that location.
2. Don a new pair of nitrile gloves and remove gauze pad from sample jar.
3. Using moderate pressure, wipe the area inside the template twice - first from left to right and second from top to bottom.
4. Place gauze pad back into sample jar and replace lid.
5. Affix a sample label with a unique sample identification number and the information in Section 3.5 of this SOP to the jar, and place it in a laboratory-supplied shipping cooler containing bagged, cubed ice.

6. Collect a field blank at least once each day wipe sampling is being conducted by following steps 2, 4 and 5 (i.e., remove wipe from jar, expose it briefly to the atmosphere and return it to the jar). See Section 2.8.2 of this QAPP for additional details.

7. Collect a "field duplicate" wipe sample at least once each day wipe sampling is being conducted. The duplicate sample is collected by wiping a 100 cm^2 area immediately adjacent to the primary (original) sample. See Section 2.8.2 of this QAPP for additional details.

2. Treated Wash Water Sampling Procedure

2.1 General

Treated wash water will be sampled and analyzed to determine if it can be reused for power washing additional areas of the building. When power washing has been completed, treated wash water will be sampled and analyzed to determine its final disposition. Section 2.8.1 of this QAPP describes the decisions and processes involved. The procedure to be used for sampling treated wash water follows.

2.2 Sampling Equipment

It is envisioned that treated wash water will be stored in portable tanks or similar containers pending receipt of laboratory results. As such, samples will collected using disposable bailers or collected directly into laboratory-supplied containers.

Equipment/supplies anticipated to be required include:

- Clean, disposable nitrile gloves
- Clean, disposable 1.6" diameter bottom-filling polyethylene or PTFE bailers
- Sample cooler(s)
- Bagged, cubed ice
- Sample labels
- Field logbook
- Sample collection/chain-of-custody forms

2.3 Equipment Decontamination

No equipment requiring decontamination is anticipated to be used to collect treated wash water samples.

2.4 Field Procedure for Treated Wash Water Sampling

1. Affix a suitable length of rope to the bailer to allow lowering and retrieval.

2. Slowly lower the bailer through the top of the container into the treated wash water to be sampled.

3. When the desired depth is reached, the water inside the bailer will close the check ball when the bailer is retrieved from the container.
4. Retrieve the bailer from the treated wash water container and discharge sample into two pre-cleaned, laboratory-supplied 1-L amber glass bottles using care to minimize agitation and aeration of the sample.
5. Repeat steps 2 through 4 if more treated wash water is needed to fill both bottles nearly full.
6. Affix a sample label with a unique sample identification number and the information in Section 3.5 of this SOP to the jar, and place it in a laboratory-supplied shipping cooler containing bagged, cubed ice.
7. Collect an equipment rinse blank only when non-disposable sampling equipment is used.
8. Collect a field duplicate sample at a frequency of one per 20 samples by filling two sets of containers in a random manner (i.e., add roughly equal volumes to all containers after each bailer retrieval).
9. Provide additional sample volume for the laboratory to analyze MS/MSD samples at a frequency of one per 20 samples. Triple the normal sample volume should be provided.

3. Bulk Concrete Coring and Sampling Procedure

3.1 General

Bulk concrete will be sampled and analyzed as part of the post-cleanup confirmation program described in Section 5.2.2 of the Work Plan and its Addendum 1. The decisions and processes involved are described in Section 2.8.1 of this QAPP. The procedure to be used for coring and sampling bulk concrete follows.

3.2 Coring and Sampling Equipment

Bulk concrete samples will be collected by removing a solid concrete core with a portable concrete coring machine fitted with a 2-inch diameter core barrel bit. The core barrel will be advanced no deeper than approximately 2 inches into the floor slab, after which the core barrel bit will be withdrawn and the sample will be removed from the core barrel. A permanent marker (i.e, Sharpie® or equivalent) will be used to mark the core with its original orientation (i.e., top/bottom). The core will be wrapped in aluminum foil, labeled and prepared for shipping to the laboratory for further processing and analysis.

Additional equipment/supplies required include:

- Clean, disposable nitrile gloves
- Distilled or purified potable water
- Low-phosphate, laboratory-grade detergent (Alconox® or equivalent)
- Brushes for cleaning core barrel bit
- Sample cooler(s)
- Bagged, cubed ice

- Sample labels
- Field logbook
- Sample collection/chain-of-custody forms

3.3 Equipment Decontamination

The core barrel bit will be decontamination prior to use and between each unique sampling location by brushing with a low-phosphate, laboratory-grade detergent solution to remove any remaining particles or surface films. The bit will be rinsed with distilled or purified potable bottled water and allowed to air dry as long as possible prior to reuse.

3.4 Field Procedure for Wipe Sampling

1. Don a new pair of nitrile gloves and remove a sufficient amount of aluminum foil to wrap the core.
2. Remove the core from the bit and mark the side of the core with "up" arrows using a permanent marker to identify the top of the core.
3. Wrap the core with the aluminum foil from step 1.
4. Affix a sample label with a unique sample identification number and the information in Section 3.5 of this SOP to the foil wrapper, place it inside a bubble wrapper or zip-top bag and put it into a laboratory-supplied shipping cooler containing bagged, cubed ice.
5. Collect a field equipment blank at least once each day concrete core sampling is being conducted by collecting a wipe sample from the decontaminated core barrel bit. See Section 2.8.2 of this QAPP for additional details.
6. Identify one concrete core for the laboratory to use as an MS/MSD sample. Only one MS/MSD sample is anticipated to be needed for the bulk concrete confirmation sampling program. See Section 2.8.2 of this QAPP for additional details.

3.5 Sample Labels/Sample Identification

Sample labels, which will be either pre-printed or handwritten in the field using indelible ink, will be affixed to all sample containers/concrete cores that contain the following information.

- A unique sample number
- Date and time of collection
- Requested analyses
- Project number
- Sampler's initials

The sample numbering system to be used is described as follows.

Example: WI-MMDDYY-AA-XXX

where:

WI - designates sample type (WI – Wipe; CC – Concrete Core; WW – Wash Water)

MMDDYY - date of collection (month, day, year)

AA - sampler's initials

XXX - unique number starting with 001

Glass containers will be packed in appropriate cushioning material to prevent breakage during sample handling and shipment. Samples will be packaged and shipped as described in Section 3 of this QAPP.

Attachment B
Laboratory Standard Operating Procedures